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U. S. DEPARTMENT  
OF AGRICULTURE

# GRADUATE SCHOOL

## *Annual Catalog*

1952-1953



WASHINGTON, D. C.

# Calendar for 1952-53

## FALL SEMESTER

Sept. 13-20	Registration (Late fee charged after Sept. 20)
Sept. 22-26	Classes begin
Oct. 3	Last day of registration for credit
	Last day of course transfer without late fee
Oct. 10	Deferred payments due
Oct. 24	Deadline for credit-audit change
Nov. 11	Armistice Day—no classes
Nov. 27	Thanksgiving Day—no classes
Dec. 19-Jan. 4	Christmas holidays—no classes
Jan. 5	Classes resume
Jan. 16	Close of Fall Semester *

## SPRING SEMESTER

Jan. 24-31	Registration (Late fee charged after Jan. 31)
Feb. 2-6	Classes begin
Feb. 13	Last day of registration for credit
	Last day of course transfer without late fee
Feb. 23	Holiday—no classes
Feb. 27	Deferred payments due
Mar. 6	Deadline for credit-audit change
May 15	Close of Spring Semester *

## SUMMER SESSION

May 23-29	Registration (Late fee charged after May 29)
June 1-5	Classes begin
June 5	Last day of registration for credit
	Last day of course transfer without late fee
June 12	Deferred payments due
June 30	Deadline for credit-audit change
August 7	Close of Summer Session *

\* Classes which have missed sessions for any reason will continue until the deficiency is made up.

## IMPORTANT

The provisions of this publication are not to be regarded as an irrevocable contract between the student and the United States Department of Agriculture Graduate School. The Graduate School reserves the right to change any provision or requirement at any time. The Graduate School further reserves the right at any time, to ask a student to withdraw when it considers such action to be in the best interests of the School.



# GRADUATE SCHOOL

UNITED STATES DEPARTMENT OF AGRICULTURE

# CATALOG

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FALL — SPRING — SUMMER  
1952 — 1953



*Please keep this catalog for use in  
the Spring and Summer.*

*This Catalog, published annually by the Graduate School, covers graduate and undergraduate programs for the Fall and Spring Semesters and the Summer Session. It is made as accurate as possible, but the right is reserved to make changes in details as circumstances require. A bulletin on correspondence study is available on request.*

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# *General Information*

## PURPOSE OF THE SCHOOL

Since its establishment in 1921, the objective of the Department of Agriculture Graduate School has been to improve the Federal Service by providing needed educational opportunities for Federal employees. The Graduate School now offers a resident instruction program in Washington of over three hundred courses and a small correspondence program. In addition, it gives lecture series, offers educational counseling, contributes to training programs in the Department of Agriculture, and participates in cooperative programs with land-grant and other educational institutions. Graduate study is the primary interest of the School but it also offers an extensive undergraduate program. Graduate School classes are open to employees of all government agencies and to persons who are not employed by the government.

## FOUNDING OF THE SCHOOL

The Department of Agriculture has been engaged in education since its founding. The organic act which established the Department in 1862 gave it the responsibility to "disseminate agricultural information in the broadest sense of the word." Thus from the beginning employees of the Department have been educators, and it soon became apparent that if they were to be successful they needed opportunities to continue their training while employed.

In 1898, Secretary of Agriculture Wilson expressed the need of the Department for an organization like the Graduate School, particularly to provide post-entry education for young scientists coming into the Department's research programs. No action, however, was taken at that time. Shortly after World War I, when the need for qualified personnel became acute throughout the government, the Congressional Joint Committee on the Reclassification of Salaries recommended that the government departments give more attention to the development of opportunities within the Federal Service for the continuing education of their employees. Accordingly in 1920, the Secretary appointed a special committee to explore the matter. After considering the committee's findings and consulting leading educational institutions and other government agencies, the Secretary established the Graduate School in 1921 and announced at that time: "I believe those who may be able to avail themselves of this opportunity will both enrich themselves and enhance the value of the service they render."

## ACCREDITED STANDING

The Graduate School does not grant degrees and has never sought that authority. It prefers to give courses of standard graduate and undergraduate grade; to have the merits of these courses judged by the well-known competence of its instructors; and to cooperate with institutions which have the authority to grant degrees.

The United States Civil Service Commission accepts Graduate School credits, for examination and qualification purposes, on the same basis as those from accredited colleges and universities.

## ADMINISTRATION

The government of the Graduate School is vested in a General Administration Board appointed by the Secretary of Agriculture. The functions of this Board correspond in general to those of boards of trustees of universities. The School is administered by a director and a small administrative staff. It is a nonprofit institution and receives no Federal funds.

The evening program in Washington is organized into eight departments. Each department is directed by a departmental committee composed of an appointed chairman and others of recognized competence in the respective fields. These committees are responsible for organizing and giving general administrative direction to the programs and activities of the departments. Within the departments, depending on the scope and specialization of the programs are divisional committees. The eight department chairmen and the Director make up the Graduate School Council. Similar committees direct other Graduate School programs.

## TEACHING AND RESEARCH RESOURCES

The Graduate School is able to draw to its staff the best trained scholars in the Federal Service, which is now a source of talent unexcelled in the nation. Many of the faculty members have had, in addition to governmental service, years of college and university teaching experience in the foremost institutions in the United States. The caliber of the teaching personnel of the School has been compared favorably with that of some of the best graduate institutions in the country.

The quality of the Graduate School staff is equaled by the library and laboratory facilities in Washington. In addition to a large library in the Department of Agriculture, containing more than a half a million volumes on both agricultural and non-agricultural subjects, students have ready access to the rich storehouses



of the Library of Congress, the Smithsonian Institution, and the National Archives. Supplementing the Department Library as necessary is a growing collection of books supplied directly by the Graduate School.

#### PUBLIC LECTURES AND SEMINARS

Lecture series on current problems give Department employees and others an opportunity to hear authorities discuss current problems in agriculture and in other national and world affairs. Lectures which are especially relevant to the needs and interests of Department employees are given during official working hours. Registration is not required and no fees are charged.

#### COOPERATION WITH THE UNIVERSITY OF MARYLAND

To provide broader educational opportunities for those served by each institution, the Graduate School of the United States Department of Agriculture and the University of Maryland have developed a cooperative arrangement under which certain resources of each institution are made available to students of both institutions. Representatives of certain subject matter departments at each institution are engaged in developing integrated educational programs.

Under these arrangements, work taken at the Graduate School of the United States Department of Agriculture may be applied as partial residence credit toward undergraduate or advanced degrees at the University of Maryland. Those wishing to take advantage of this arrangement must work out an approved program of study in consultation with appropriate officials at the University of Maryland. This should be done at a point as early as possible in their programs.

Graduate School students wishing to take advantage of these opportunities may secure instructions from the Registrar.

#### COOPERATION WITH BOSTON UNIVERSITY

The Graduate School in 1952 concluded an agreement with Boston University for the cooperative establishment of educational programs for federal employees in the Boston metropolitan area. These programs will consist of evening courses designed to meet the special needs of government employees. They will be offered at Boston University beginning with the 1952-1953 academic year. Boston University will grant credit for work done in these programs and will confer degrees earned. A special announcement of these programs is available.

### COOPERATIVE INTERNSHIP PROGRAM WITH LAND-GRANT INSTITUTIONS

Post-graduate and post-doctorate personnel in Land-Grant Colleges and Universities are afforded opportunities for research and for gaining other desirable experience under a program developed jointly by a committee from the Graduate Council of the Association of Land-Grant Colleges and Universities and the Graduate School. This work is under the direction of the Department of Agriculture professional staff in Washington, the Agricultural Research Center and elsewhere. Specific arrangements under this program are between personnel from these educational institutions and agencies in the Department. Details may be had from the Office of Personnel or the Graduate School.

### CERTIFIED STATEMENTS OF ACCOMPLISHMENT

Certified Statements of Accomplishment are offered in the fields of Accounting, Administrative Procedures, Agricultural Economics, Public Administration, and Statistics upon the student's completion of specified programs of study. Each student interested in earning a Certified Statement of Accomplishment in any of these fields should receive approval, from the Registrar, of his proposed program of study. For complete details see the outlined program in the Department concerned.

These statements are offered to encourage the student to complete a well-organized program in his chosen field of study or work. Each student who receives a certified statement also will be given an official transcript of his completed program which he may use as a public record of qualification.

### GRADUATE SCHOOL PUBLICATIONS

Publications of the Graduate School include:

1. A general annual *Catalog* which contains detailed information about the resident educational program in Washington, D. C.
2. Time Schedule and Supplement, published each semester—fall, spring and summer—which carries added details about the resident educational program in Washington.
3. Books and periodicals, published at irregular intervals containing: original contributions by faculty members; special lectures devoted to the advancement of the arts and sciences; and significant manuscripts prepared by employees of the Department of Agriculture, which the Department has been unable to publish. A partial list of these publications is given on the outside back cover of this *Catalog*.



# *Regulations and Procedures*

## ADMISSION

Admission to resident courses in the Graduate School is open to all qualified persons.

## ENTRANCE REQUIREMENTS

Since the Graduate School does not offer degree programs, entrance requirements differ with the level of the course for which the student is registering.

Undergraduate courses, in general, are open to persons who are graduates of a standard high school or equivalent or who qualify for the course because of satisfactory work experience. For admission to more advanced courses college work in the same or related field is specified or understood. For other courses definite prerequisites may be stated. Year courses require the completion of the work of the first semester or its equivalent.

## VETERANS

Graduate School courses are available to veterans of World War II under the provisions of Public Laws 346 and 16 as amended. Registration for part-time study is charged against educational benefits only in the proportion that the number of semester hours bears to a full normal load.

Veterans who are re-entering Graduate School classes after an interruption of training or who are entering the Graduate School for the first time are advised to consult the Registrar of the Graduate School sufficiently in advance of registration that a program may be determined and the necessary arrangements made with the Veterans Administration. An official Certificate of Eligibility and Entitlement is accepted by the Graduate School in lieu of tuition fees and charges for books and supplies.

Veterans who do not have a valid certificate of entitlement at the time of registration are expected to pay the regular tuition fees. These fees are refunded to the student when the certificate is presented to the School.

## COUNSELING SERVICES

Officers of the Graduate School are available, throughout the registration periods and from 9:00 a.m. to 5:00 p.m. each day for counseling on educational plans, whether courses are to be pursued in the Graduate School or in other institutions. In addition, where necessary, arrangements are made to refer persons having

special problems to authorities in the particular field of work or study.

#### TRANSFER OF CREDIT

Careful planning is important for any prospective student, but particularly so for the Federal employee who wishes to make a substantial beginning in his educational program through the Graduate School, where degrees are not granted and credits must eventually be transferred to a degree-conferring institution. A student cannot assume that credit for work done at the Graduate School will be accepted by any particular college or university. Universities generally accept transfers of credit on the basis of the individual courses taken, the student's over-all program, and the quality of the work done by the student.

The student who wishes to take an advanced degree should consult in advance the dean of the graduate school of the institution where he expects to become a candidate for his degree to secure approval for whatever portion of his program the institution of his choice will accept from the Graduate School. The student who is deficient in basic undergraduate courses needed as a foundation for his graduate program will find many of them available in the large undergraduate program of the Graduate School. Others may be found in local universities.

A student who is planning work toward an undergraduate degree should consult in advance the dean of the institution from which he expects to receive the degree if he wishes credit toward the degree for work taken at the Graduate School.

#### REGISTRATION

The registration period for each semester is shown on the School calendar on the inside front cover. A late fee per course is charged for registration after the opening of the semester. After the second week of classes in the fall and spring semesters, and after the first week in the summer session, students may register for credit only with the approval of the instructor and the Registrar. Registration is not completed until the required fees have been paid.

#### COURSE LOAD

Students employed full time may carry more than two courses only with the permission of the Registrar.

#### FEES

*Course Fees.* In general, fees are computed at \$9.00 per semester hour credit for strictly undergraduate courses and \$10.00 per semester hour for graduate and advanced undergraduate courses.

*Late Fees.* There is a \$2.00 per course late registration fee and a \$1.00 per course late transfer fee as shown in the School Calendar.

*Reinstatement Fee.* Students who fail to meet payments when due are charged a reinstatement fee of \$2.00 per course in addition to all accrued fees.

*Laboratory Fee.* Laboratory or materials fees are listed in the Schedule of Classes for each semester, in connection with the courses for which they are charged.

*Service Fee.* A fee of \$1.00 per course is charged each student using the deferred payment plan.

*Transcript Fee.* There is a 50¢ fee for each copy of a student's record on the regular Graduate School form or on the form of another institution or state board of education.

#### PAYMENT OF FEES

Fees are due and payable in advance at the time of registration. Registration is not complete and no student is permitted to attend classes until all fees have been paid.

In exceptional cases, an arrangement may be made at the time of registration for payment of fees in two installments, one half plus a service fee at the time of registration, and the balance by the end of the fourth week in the fall and spring semesters, and by the end of the second week in the summer session.

A student who fails to meet payments when due will be suspended and may not attend classes until he has been reinstated and has paid all accrued fees as well as a reinstatement fee of \$2.00 per course.

All fees are payable at the Graduate School business office, Room 1031, South Building, United States Department of Agriculture.

#### ATTENDANCE AT CLASSES

Students are expected to attend all class sessions and not to absent themselves without adequate reason.

Absences do not relieve the student from responsibility for work required while he was absent, and the burden of proof that the work was done rests with the student. In courses in which the work cannot be satisfactorily tested by written examination, the instructor shall be the judge of the relation of the student's attendance or non-attendance to his grade. A student registered for credit in an undergraduate course who is absent more than 25% of the class periods receives a mark of "W," withdrawn, unless he makes up all required work. Auditors who are absent more than 25% of the class periods receive the mark of "W."

## CREDIT AND GRADES

*Academic Credit.* Persons registering for academic credit must satisfy all prerequisites for admission to the course as generally stated or specified in the course description.

*Audit.* An auditor must meet the same prerequisites as a credit student. He receives full privileges of class participation if he chooses to exercise them. An auditor does not receive a grade; he receives only a mark of AUD.

*Change from Audit to Credit.* A student may change his registration from audit to credit, or vice versa, within thirty days after the beginning of the semester in the fall and spring, and within three weeks after the beginning of the summer session. The request for change must be made in writing to the Graduate School. Special forms are available at the School office.

*Grades.* At the close of the semester students receive written notice by mail of grades received. The following letter grades are used:

A	Excellent
B	Good
C	Fair
D	Passable
F	Failure
Aud	Auditor
Inc	Incomplete
W	Withdrawn

## TRANSCRIPT OF CREDIT

*Inclusion in Personnel Record for Department of Agriculture Employees.* To aid in effecting its promotion-from-within policy, the Department has provided (USDA Administrative Regulations, Title 8, Chapter 42, paragraphs 1548-1551, dated 10-13-48) that a record of Graduate School credits earned by its employees will be placed in official personnel files of the agency. Unless specifically requested by the employee that such action not be taken, the Graduate School will forward, upon completion of the courses or at the end of the year, a copy of the student's record, without cost to the employee, to the personnel officer of the administration, bureau or office in which the student is employed.

*Certification on Request.* Upon a student's written request and the payment of the transcript fee, an informational record or an official transcript will be sent to him or to an agency or institution designated by him. An official transcript will be sent only when the student has filed with the Graduate School a transcript of his



previous academic work showing that he has met all requirements for admission to the level of the courses for which he registered.

#### WITHDRAWAL AND REFUNDS

Application for withdrawal from Graduate School classes must be made in writing to the Registrar. A form for this purpose is available in the Graduate School Office. *Reporting the dropping of a course to an instructor does not constitute an official withdrawal.* Permission to withdraw will not be given to a student who does not have a clear financial record.

Refund of tuition fees only will be granted in cases of official withdrawal according to the following schedule:

<i>Fall and Spring Semesters</i>	<i>Refund</i>
During first and second weeks of term	Tuition less \$5.00 per course registration fee.
During third and fourth weeks of term	60% of tuition (a minimum of \$5.00 per course will not be refunded).
During fifth and sixth weeks of term	40% of tuition.
<i>Summer Session</i>	
During first week of session	Tuition less \$5.00 per course registration fee.
During second week of session	60% of tuition (a minimum of \$5.00 per course will not be refunded).
During third week of session	40% of tuition.

*Refunds will be computed as of the date the application for withdrawal is received in the Graduate School Office.* In no case will tuition be reduced or refunded because of non-attendance in classes. No refund will be made of laboratory or other incidental fees.

Since commitments for instruction and other arrangements are necessarily made in the beginning of the semester, no refunds for any reason can be made except in accordance with the above schedule.

—O—

The Graduate School reserves the right to cancel any course if registration does not warrant continuance; to discontinue, postpone or combine classes; to change instructors; to change classroom assignments; to make any changes deemed advisable in registration

and in fees; and to require the withdrawal of any student at any time for such reasons as the School deems sufficient.

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### *Courses of Instruction*

Courses given during the academic year 1952-53 are listed on the following pages by departments of instruction. The departments are listed alphabetically.

The words Fall, Spring and Summer indicate the semester in which the course is offered. The number of credits indicates the value of the course in semester hours. Bracketed numbers indicate courses which will not be given in 1952-53.

Courses numbered 1-100 are non-credit; 100-399, undergraduate; 400-699, advanced undergraduate (senior) and graduate; above 699, graduate only.

# Biological Sciences

## DEPARTMENTAL COMMITTEE

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LAWRENCE V. COMPTON

RALPH E. HODGSON (Vice-chairman)

E. L. LECLERG

DANIEL L. LEEDY

BYRON OLSON

RAYMUND L. ZWEMER

—O—

Scientific efforts have been greatly intensified in recent years with the result that research discoveries and subsequent developments have a direct bearing on the activities of every individual and organization. Many government workers in fields only indirectly related to biology often need an understanding of basic principles in the biological sciences to do a competent job in their own fields. On the other hand, government workers in the biological sciences are continually faced with the problem of keeping abreast of the rapid advances in the application of these principles and new gains in basic knowledge. The Department of Biological Sciences has arranged a series of courses to meet the needs of each of these groups. These courses are taught by outstanding specialists from Federal and other research institutions. To permit wide discussion, courses for advanced students are arranged as seminars.

—O—

### [1-209.] **Systematic Botany—Principles of Classification** (1953-54 and alternate years)

Fall, 2 credits

SIDNEY F. BLAKE

### [1-210.] **Systematic Botany—Identification Techniques** (1953-54 and alternate years)

Spring, 2 credits

SIDNEY F. BLAKE

### **1-250. Bacteriology**

Year, 3 credits each semester (alternate years)

Instructor to be announced

An introductory course in the morphology and physiology of bacteria. Training is given in the preparation of various culture media, in methods of sterilization, in staining techniques, in the cultivation and identification of bacteria, and in standard methods of water and milk analysis. The class meets in the Biology Laboratory of Wilson Teachers College, 11th and Harvard Sts., N. W. *Prerequisite:* College botany or equivalent.

**1-300. Fundamentals of Entomology**

Spring, 3 credits (alternate years)

REECE I. SAILER

An introductory course designed to provide the student with the basic elements of entomology. Recognition of the principal orders of insects and their important families is stressed. A study of the terminology and identification with the anatomical structure of insects. Attention is given to the biology of insects and to their phylogenetic and ecological relationships to other organisms. Lectures, discussion, laboratory and Saturday morning field trips. *Prerequisite:* Basic training in biology or consent of instructor.

**1-320. Human Physiology**

Year, 3 credits each semester (alternate years)

HENRY W. OLSON

A course in human physiology intended to give the student a basic knowledge of the structure and functions of the systems of the body: the circulatory, respiratory, digestive, nervous, skeletal, reproductive, and endocrine. The laboratory work includes dissection of organs, experiments on digestion, nutrition, the nervous system, sense organs, microscopic examination of tissues, and has been planned to give the student a better understanding of the methods of scientific investigation. The class meets in the Biology Laboratory of Wilson Teachers College, 11th and Harvard Sts., N. W. *Prerequisite:* College zoology or equivalent.

**[1-340.] Principles of Mammal and Bird Control (1953-54 and alternate years)**

Fall, 2 credits

CLIFFORD C. PRESNALL, WALTER W. DYKSTRA and SPECIALISTS

**[1-512.] Medical and Veterinary Entomology (1953-54 and alternate years)**

Year, 2 credits each semester

F. C. BISHOPP

**1-518. New Developments in Insecticides**

Fall, 2 credits (alternate years)

F. C. BISHOPP and SPECIALISTS

Discussion by specialists in this field which has advanced rapidly during and since World War II. The chemistry of insecticides, their manufacture, pharmacology, compounding, methods of application, and equipment. Usefulness of insecticides in protecting man, clothing, buildings, houses, livestock, gardens, fruit, field crops, forests, and stored products from insect attack. Practical problems involved in the use of various insecticides and fumigants. Review of recent applicable literature. *Prerequisite:* Basic courses in biology and chemistry, or consent of instructor.

**[1-519.] New Developments in Fungicides (1953-54 and alternate years)**

Fall, 2 credits

JOHN C. DUNEGAN

**[1-570.] Design of Experiments in Biological Sciences (1953-54 and alternate years)**

Year, 2 credits each semester

D. D. MASON and SPECIALISTS

**[1-603.] Advances in Plant Breeding and Genetics (1954-55 and every third year)**

Fall, 2 credits

MARTIN G. WEISS and SPECIALISTS



**1-608. Advances in Human and Animal Nutrition**

Spring, 2 credits (alternate years)

PAUL E. HOWE and SPECIALISTS

A seminar on nutrition of man and animals, specifically and comparatively. The effect of variations in the development of animals and plants on nutritive value and changes resulting from processing. The reactions of man to food as it influences the nutrition of man. *Prerequisite:* Basic training in nutrition or consent of instructor.

**1-609. Recent Developments in Plant Physiology**

Fall, 2 credits (alternate years)

MARION W. PARKER and SPECIALISTS

Discussion of recent investigations in plant physiology. Photosynthesis; growth regulation substances; the effect of light intensity and quality and varying photoperiods on growth and reproduction behavior of plants.

**[1-610.] Recent Developments in Plant Nutrition (1953-54 and alternate years)**

Fall, 2 credits

MARION W. PARKER and SPECIALISTS

**1-620. Recent Advances in Weed Control**

Spring, 2 credits (alternate years)

WARREN C. SHAW, R. L. LOVVORN and SPECIALISTS

A presentation of theoretical and practical aspects of weed control in relation to agricultural economy, including classification, distribution, development, and destruction of weeds; the description and classification of herbicidal compounds; and control by mechanical, biological, and competitive cropping practices. Attention will be given to methods of weed control in field crops, horticultural crops, lawns and turf, and in special situations including non-agricultural lands, irrigation systems, etc. *Prerequisite:* A basic knowledge of plant physiology and organic chemistry or related subjects.

**[1-702.] Radioisotopes and High Energy Radiation in Biology (1953-54 and every third year)**

Spring, 2 credits

B. T. SHAW, STERLING B. HENDRICKS and SPECIALISTS

# Languages and Literature

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GEORGE E. BEAUCHAMP

LESTER A. SCHLUP

J. P. BLICKENSERFER

RALPH R. SHAW

ERWIN JAFFE

FRANKLIN THACKREY (Vice-chairman)

KENNETH W. OLSON

R. LYLE WEBSTER

## IMPORTANCE OF ENGLISH, WRITING AND SPEECH

Among students preparing for technical careers and among busy people employed on the basis of their technical competence, there is an inevitable tendency to concentrate on subject-matter specialties, to the great neglect—if not exclusion—of the auxiliary subjects that can effectively implement such specialties. It is common knowledge in the Government service that nothing so much retards the progress of many young technicians, scientists, and other professional personnel as their inability to incorporate the results of their thinking and of their research in effective, concise, lucid English, written or oral. Technical knowledge is of no value unless it can be communicated to others. There are indeed few persons who cannot greatly benefit from the further sharpening of their tools of communication.

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## ENGLISH AND LITERATURE

### 2-118. Practical English Usage

Fall, 2 credits. Repeated in Spring and Summer

CHARLOTTE MANGOLD

VERNE L. SAMSON

This course enables students through practice to master the fundamentals of correct English. Troublesome problems of English usage, sentence structure, choice of words, style, and grammar, are studied as aids to clear and forceful writing of letters, memoranda, and reports.

### 2-119. Vocabulary Building

Fall, 2 credits. Repeated in Spring and Summer

CHARLES D. MURPHY

Study of the sources and origins of words in order to gain insight into their present meanings. Principles of word formation; dictionary study and exercises in word selection. The course stresses the most common Latin and Greek roots used in forming English words.

### 2-222. English Composition

Year, 3 credits each semester

FRANCES H. MILLER

KAY B. WEBER

Equivalent of freshman English. An introductory course in writing and English usage, designed especially for those who need a course preparatory to more advanced English studies. Special attention given to the fundamental

principles and mechanics of good writing—grammar, punctuation, spelling, diction, etc. Exercises in writing short and long themes and in studying, analyzing, and evaluating selected English prose texts.

## 2-223. Descriptive English Grammar

Fall, 2 credits. Repeated in Spring and Summer

SUSAN E. HARMAN

A course in the study of grammatical principles, stressing sentence structure and correct English form. Lectures on the history and development of inflectional and derivational forms. Exercises in diagramming and in analyzing examples of good and bad English.

## 2-85. Creative Writing

Summer, non-credit

FRANCES H. MILLER

Lectures on types of fiction and the study of techniques. Analysis of short stories. Writing of short stories or simpler forms of narration. *Prerequisite:* One year of college English or the equivalent.

## 2-230. Playwriting

Fall, 2 credits

TERRENCE W. McCABE

A study of the techniques of playwriting: plot, structure, characterization, problems of the dramatist. Lectures and discussions. Analysis of prescribed plays.

## 2-231. Playwriting Workshop

Spring, 2 credits

TERRENCE W. McCABE

An active participating class for those who have written or are writing plays. Study and analysis of playwriting techniques. Student plays will be read in class by actors and criticized by the class. Plays meriting public showing will be considered by the Agriculture Players for production.

## 2-235. Fiction Writing

Fall, 2 credits

PATRICIA McGERR

Stresses such fiction fundamentals as plotting, characterization, dialogue, story organization, testing readability and interest, and increasing dramatic quality of writing. Emphasizes writing techniques which increase salability of student manuscripts by discussing editorial taboos, ways to obtain salable story ideas, and methods of marketing manuscripts. *Prerequisite:* English Composition or equivalent, or permission of instructor.

## 2-242. Fiction Writing Workshop

Spring, 2 credits

PATRICIA McGERR

Discussion, criticism and suggestions for revising student manuscripts. Emphasizes methods of slanting for particular markets, discussions of what editors buy and why, and ways to polish manuscripts to increase sales possibilities. *Prerequisite:* Fiction Writing or equivalent.

## 2-280. Feature Writing

Fall, 2 credits

DUNCAN N. SCOTT

Stresses how to find article ideas, how to do the research necessary to develop them into salable articles, best methods of presentation of material, ways to polish writing to make it more salable, ways to determine magazine needs, how to slant material for particular magazines, and how to test readability and interest of writing. *Prerequisite:* English Composition or equivalent, or permission of instructor.

## 2-281. Feature Writing Workshop

Spring, 2 credits

DUNCAN H. SCOTT

Discussion, criticism and suggestions for revising student manuscripts. Emphasizes methods of slanting for particular markets, discussions of what editors buy and why, and ways to polish manuscripts to increase sales possibilities. *Prerequisite:* Feature Writing or equivalent.

## 2-330. Great Books I

Year, 2 credits each semester \*

M. CLARE RUPPERT

Group discussion, under leadership, of important works in poetry, history, philosophy and criticism. The leader will try to help with the reading and understanding, but the books themselves will be the teachers. The intention of the course is to give insight into perennial, and therefore contemporary, problems, not historical and literary information. The only qualifications required are an interest in ideas and belief in free discussion. With few exceptions the books will be read in their entirety. One, two, or three meetings will be given to a book depending upon its length. Discussion will center around the following authors:

Fall Semester: Bible, *Book of Job*; Homer, *Odyssey*; Sophocles, *Oedipus Rex*, *Antigone*; Plutarch, *Lives: Alexander and Caesar*; Plato, *Apology* and *Crito*; Plato, *Republic*, books 4-6; Aristotle, *Politics*, *Ethics*; Marcus Aurelius, *Meditations*; St. Augustine, *Confessions*; St. Thomas Aquinas, *On the Law*.

Spring Semester: Bible, *Gospel of St. John*; Dante, *Divine Comedy*; Machiavelli, *the Prince*; Montaigne, *Selected Essays*; Shakespeare, *King Lear*, *Hamlet*; Rousseau, *Social Contract*; *Federalist Papers*; Goethe, *Faust*; Marx, *Communist Manifesto*; Veblen, *Theory of Leisure Class*; Adams, *Education of Henry Adams*.

\* Students may attend both semesters or either semester.

## 2-332. Great Books II

Year, 2 credits each semester

JOHN T. CHENEY

Group discussion, under leadership, of works of the authors listed. While the leader will endeavor to help with the reading and understanding, the books themselves may be considered the teachers. The intention is to give insight into perennial, and therefore contemporary, problems, not historical and literary information. The central theme of the Fall semester is the relationship of fact and information; of the Spring term, individual freedom and responsibility to society. Qualifications required are an interest in ideas, and belief in free discussion; it is in addition urged that the students have completed Great Books I. Authors to be read include:

Fall Semester: Thucydides, *History of the Peloponnesian War*; Aristophanes, *Lysistrata*; Aeschylus, *Agamemnon*; Euripides, *Medea*; Hobbes, *Leviathan*; Plato, *Phaedo*; Milton, *Areopagitica*; Aristotle, *Poetics*; Plato, *Symposium*; Cervantes, *Don Quixote*.

Spring Semester: Kant, *Fundamental Principles*; Ibsen, *Master Builder*, *Wild Duck*, *Ghosts*; Xenophon, *Persian Expedition*; Lucretius, *On the Nature of Things*; Tawney, *Religion and the Rise of Capitalism*; Sophocles, *Oedipus at Colonus*.

## 2-335. Teachings of the Great World Religions

Fall, 3 credits

J. CALVIN KEENE

Intended to introduce the student to five of the great living religions of the world: Judaism, Christianity, Islam, Hinduism, Buddhism. Study of the origins, primary doctrines, practices, and scriptures of each. Comparisons and contrasts between the various religions and the various forms of each religion.



**2-336. Great Thinkers of the Past**

Spring, 3 credits

J. CALVIN KEENE

A basic course in the thought of the greatest of the western thinkers. The principal ideas of each, and study of the relationship of these ideas to each other. Emphasis is on the following men: Plato, Aristotle, Augustine, Descartes, Locke, Berkeley, Hume, and Kant.

**INFORMATION METHODS****2-75. Introduction to Library Techniques**

Year, non-credit

MARIETTA DANIELS

Emphasis on methods and techniques used in processing the books in libraries: order and accession records, cataloging and classification records, circulation records, shelf list, filing inter-library loan records, introduction to general reference books. Actual work with books, records and filing.

**2-200. Readable Writing**

Spring, 2 credits (alternate years)

AMY G. COWING and HARRY MILEHAM

Teaches you how to write so that more people will read and understand your articles and bulletins; how to estimate how easy or hard the reader will find your writing; how to organize your writing for easy reading. Deals briefly with the use of pictures and other visual aids to reading. Much of the course centers around use of the Flesch Readability Formula and consists of lectures and workshop sessions in which students make practical application of writing principles.

**2-220. Indexing**

Fall, 1 credit

MABEL H. DOYLE

This course is intended primarily for those interested in making indexes for periodicals, bulletins, reports, and books. Emphasis will be placed on general procedures and matters of policy as well as on basic principles and techniques. Specific types of indexing adapted to various subjects and popular style, contrasted with technical and scientific styles, will be studied. Examples of different kinds of indexes will be shown and opportunity given for practical work in the preparation of indexes, including the making of cross references, alphabetizing, and editorial preparation of index cards and manuscripts for the printer. *Prerequisite:* A knowledge of library or editorial work is desirable.

**2-225. Principles of Editing and Their Application**

Fall, 3 credits

ROY E. MILLER and GENIANA R. EDWARDS

Intended primarily for those seeking information on editorial techniques involved in handling manuscripts after they leave the author's hands and until they are issued in printed form. Discussion of the fundamental principles of editing, including the organization or rearrangement of material for effective presentation; rhetorical style in relation to subject matter; word forms, sentence structure and effective use of English; the Style Manual of the Government Printing Office; considerations governing titles, tables of contents, headings, footnotes, illustrations, literature citations and bibliographies, and statistical checking; the principles of table formation and arrangement; the relation of type to subject matter and the techniques of printing; and the fundamentals of indexing and proofreading. Opportunity is afforded to apply these principles in practical work in editing, which is then discussed in class. A trip to the Government Printing Office is arranged to note and study operations there.

**2-226. Introduction to Official Writing**

Fall, 2 credits

J. KENDALL McCLARREN, MARGUERITE GILSTRAP, and VIRGINIA G. TATUM

This course covers the principles of clear statement which must be applied to all forms of writing. Emphasis is given to the special requirements of official writing in economic and scientific research, government organization, and policy. The course considers ways of making official writing clear, vigorous, and readable in spite of the necessary rules and restrictions. It is designed for people who are not professional writers but whose work calls for some copy preparation. One major writing project is required. *Prerequisite:* College freshman English or the equivalent in writing experience.

**2-227. Workshop in Official Writing**

Spring, 2 credits

J. KENDALL McCLARREN, MARGUERITE GILSTRAP, and VIRGINIA G. TATUM

This course is a continuation of Introduction to Official Writing. The informal workshop approach is designed to meet the individual needs of students whose work requires some writing. Writing principles developed in the previous course are applied to reports, scripts, releases, and other media. *Prerequisite:* Introduction to Official Writing or its equivalent.

**2-237. Government Printing Procedure**

Spring, 2 credits

LOUIS H. ANDERSON

Intended for those who plan, prepare, or procure printing, duplicating, and distribution of books, pamphlets, folders, posters, charts, forms and other printed or duplicated matter. Subjects covered include: analysis of manuscript copy and its purpose to determine format and method of production; organization of copy for effectiveness; copy fitting and measuring; ways to aid the reader to grasp the message of the printed word; legibility and readability; type faces and typography; illustrations; printing and duplicating processes and criteria for their use; paper; binding methods; preparation of copy for duplicator and printer; handling of proofs; specifications and cost factors; and channels and methods of distribution of Government publications. The knowledge of methods and procedures to be acquired from this course is intended to give the student competence and confidence in dealing with author and editor, and printing, duplicating and distribution technicians.

**2-240. Audio-Visual Aids in Information and Education**

Fall, 2 credits

SEERLEY REID and R. LYLE WEBSTER

A survey of the many ways audio-visual aids can be used in training, employee relations, and information and education programs. Covers not only newer materials such as motion pictures, filmstrips, and recordings, but also modern uses of photographs, charts, graphs, maps, and the like—even the art of using a blackboard. Gives practical suggestions on the most effective use of these aids for different purposes—developing physical skills, imparting information, changing attitudes, and otherwise influencing human behavior. Lectures and demonstrations with guest speakers presenting material on special topics. Each student will have the opportunity to choose his own problem for intensive study.

**2-247. News Writing**

Fall, 2 credits

HOWARD L. KANY

What news is; structure of the news story; writing the news story; news story style. The role of the reporter; the reporter as a specialist. Objectivity in the news story; interpretation and explanation in the news story; backgrounding the news; readability in news. Handling of news stories by newspapers, press associations and news magazines. News writing for radio. Libel. Use of the news

story in public information programs. *Prerequisite:* English Composition or equivalent, or permission of instructor.

## 2-248. News Writing Workshop

Spring, 2 credits

HOWARD L. KANY

Discussion, criticism and suggestions on reporting, writing and editing techniques of news stories as applied to the preparation of actual coverage of various types of news: conventions; interviews; news conferences; congressional hearings; politics; reviews of drama, music, motion picture, TV and radio shows. Researching a news story. Emphasis on public affairs reporting.

## 2-360. Advanced Practice in Editing

Spring, 2 credits

GENIANA R. EDWARDS and SPECIALISTS

Advanced instruction in literary and statistical editing and handling of graphic materials. Students will edit a practice manuscript requiring reorganization, extensive editing, and uniform styling. Several Government agency styles for citation, tables, graphics, and other details will be compared, and adaptation of style meeting special requirements yet conforming to Government Printing Office rules will be studied. Administrative procedures for work on pamphlets, magazines, etc., will be outlined. *Prerequisite:* Principles of Editing and Their Application, or consent of instructor.

## 2-450. Workshop in Technical Writing

Fall, 2 credits

MARGUERITE GILSTRAP

A course designed to help scientists and economists improve their research reports and articles for professional publications. The first 3 weeks are devoted to a survey of the fundamentals of writing the scientific report: its characteristics, parts, functions, the steps in preparation, the process of criticism. The remainder of the term is spent in the preparation, criticism, and revisions of reports and articles—written for official use when possible. *Prerequisite:* Undergraduate degree in one of the sciences, engineering, economics, or similar technical field.

## 2-552. The Logic of Mechanizing Information

Fall, 1 credit

CHARLES A. BAYLIS and MORTIMER TAUBE

A course of eight lectures and discussions on the basic logical principles of mechanically organizing and classifying information. Application of the principles to problems of organizing information for the specific purposes of science, industry, and government. Intended for intelligence analysts, scientific analysts, librarians, information officers and others who have felt the impact on their work of the new developments in machine handling of information.

### SPEECH

## 2-228. Fundamentals of Speech

Fall, 2 credits. Repeated in Summer

VIRGINIA B. ROSER

Through the preparation and delivery of short original speeches the student gains poise, assurance, and the ability to express himself clearly and accurately. Strict adherence to time limit quickens mental processes and develops discrimination in the selection of speech material. Voice, articulation, and pronunciation drills. Posture, movement, and gesture. Learn to speak by speaking at each class meeting. Constructive criticism.

## 2-229. Public Speaking

Spring, 2 credits

GEORGE E. BEAUCHAMP

Students enrolling for this course should have had Fundamentals of Speech or some speech-making experience. Emphasis is placed on determining what one's purpose is in speaking, and accomplishing that purpose effectively. How to be interesting and clear, how to develop and support ideas, and how to handle discussion. Each student speaks and receives personal speech suggestions at each class meeting.

**2-232. Voice and Remedial Speech**

Fall, 2 credits. Repeated in Summer

WALTER B. EMERY

Study and intensive drills in voice production, flexibility, range, articulation, and enunciation. Training and practice are designed to improve vocal conditions for all speech purposes and to remedy minor speech difficulties. In order that students may receive more individual attention, registration is limited to twenty.

**2-234. Correction of Speech Dialect**

Spring, 2 credits

WALTER B. EMERY

Designed for persons having local or foreign dialect wishing to acquire standard American pronunciation and speed; intensive phonetic studies and drills to help the student hear properly and produce correctly American speech sounds and to avoid deviations therefrom; special reading and speaking exercises to improve diction and conversational ability; training is designed to serve individual needs.

**2-350. Conference Methods and Procedures**

Spring, 2 credits

GEORGE E. BEAUCHAMP

For persons who take part in formal or informal meetings either as chairmen, leaders, or participants. How to develop and work within an effective agenda, stimulate profitable discussions and arrive at worthwhile and equitable conclusions. How to develop and express one's point of view effectively in discussion.

**2-400. Persuasive Speaking**

Fall, 2 credits

GEORGE E. BEAUCHAMP

Intended for persons who have had one or both of the courses, 2-228 and 2-229, or their equivalent in speaking experience. Special attention is given to outlining and organizing speech materials, to developing interesting speech style, and to studying the techniques of influencing people's belief and behavior. Among the topics studied are emotion, rationalization, stereotypes, prejudice, and the will-to-believe.

**FOREIGN LANGUAGES**

The Graduate School provides opportunities for instruction in a wide range of foreign languages. The person who is seeking the maximum practical value from a foreign language must learn not only to translate it but to think in it well enough for translation to be unnecessary. It is the aim of those responsible for these courses to conduct them so as to develop in their students a ready and intelligent use of the language.

**FRENCH****2-253. Elementary French**

Year, 3 credits each semester

JACK C. ARNOULD  
HENRI DE MARNE  
MARGUERITE ETIENNE

Provides basic knowledge of French grammar and vocabulary. Reading, translation, dictation, and some conversation. The teaching of the proper pronunciation is stressed. For beginners.



## 2-254. Intermediate French

Year, 3 credits each semester

JACK C. ARNOULD

Systematic review of French grammar. Writing of French composition, reading, translation, dictation, conversation. For students who have had one year of college French, or two or three years of average grammatical preparation below college level.

## 2-255. Advanced French—Conversation

Year, 2 credits each semester

MARGUERITE ETIENNE

Designed to develop in students a fluent style of idiomatic conversation on topics most likely to be met in travelling in French speaking countries. Grammar review only if deemed necessary. Some composition and dictation exercises. Reading of current French newspapers and magazines. *Prerequisite:* Two years of college French or the equivalent; a good knowledge of grammar and a sizeable vocabulary.

## 2-40. Everyday French

Spring, non-credit. Repeated in Summer

JACK C. ARNOULD

For students who have had one year or more of French who wish to improve their French reading and conversation. Less emphasis on grammar than in Intermediate French. Slight review of grammar. Reading, translation, dictation, and conversation.

## GERMAN

## 2-259. Elementary German

Year, 3 credits each semester

MARIANNE LEDERER  
JOSEPH PONTI

Essentials of German grammar. Reading and writing simple prose. Introduction to extensive reading. Some conversation. Training in the fundamentals required to go on to Intermediate German.

## 2-260. Intermediate German

Year, 3 credits each semester

MARIANNE LEDERER

Grammar review. More extensive reading and vocabulary building to provide an adequate foundation for understanding German texts and carrying on conversation. *Prerequisite:* One year of college German, or two or three years of average grammatical preparation below college level.

## 2-261. Advanced German—Conversation

Year, 2 credits each semester

MAGNA E. BAUER

Development of facility in discussion and reading, use of idioms, writing and thinking in the language. *Prerequisite:* Two years of college German, or the equivalent.

## 2-41. Everyday German

Spring, non-credit. Repeated in Summer

MAGNA E. BAUER  
JOSEPH PONTI

Accuracy and facility in the use of oral German through listening to spoken German, reading, word analysis, and particularly repetition of the "basic thousand words" in round-table conversation. Work will be adapted to the members of the class. The beginner will have a chance to acquire a working vocabulary; the more advanced student will have an opportunity to practice the correct use of words, phrases, and idiomatic expressions. For beginners in the language as well as those who have had one year or more of German.

## ITALIAN

**2-270. Elementary Italian**

Year, 3 credits each semester

JOSEPH PONTI

Essentials of Italian grammar. Reading and writing simple prose. Introduction to extensive reading, some conversation.

## PORTUGUESE

**2-290. Elementary Portuguese**

Year, 3 credits each semester

JACOB ORNSTEIN

Basic grammar and vocabulary. Reading, translation, conversation. For beginners.

## RUSSIAN

**2-295. Elementary Russian**

Year, 4 credits each semester

GEORGE M. KORENEV ROCKWELL  
EUGENIA TARAKUS

Designed to give the student a sound foundation in basic Russian. Includes reading, writing, and speaking of Russian. Special attention is given to the fundamental rules of Russian grammar, Russian phonetics, and the mechanics of good reading and writing. The first semester covers the first 18 lessons of the textbook, "Bondar's Simplified Russian Method, Seventh Edition," and the second semester covers the second 18 lessons. Students should have a good knowledge of English grammar.

**2-296. Intermediate Russian**

Year, 3 credits each semester

GEORGE M. SAHAROV

Reading and translation, grammatical analysis, dictation and conversation in Russian. *Prerequisite:* One year of Russian which included the completion of a basic grammar text, Bondar or the equivalent.

**2-297. Conversational Russian**

Year, 3 credits each semester

GEORGE M. SAHAROV

This course is alternated with Advanced Russian, depending upon student demand. For students who have had at least two years of Russian language training.

**2-299. Advanced Russian**

Year, 3 credits each semester

GEORGE M. SAHAROV

Reading and translation of more advanced Russian texts, composition in Russian, oral and written translation from English to Russian. Conversation. *Prerequisite:* Two years of Russian.

**2-45. Review of Elementary Russian**

Summer, non-credit

GEORGE M. SAHAROV

General review of Russian grammar, accompanied with oral and written exercises. *Prerequisite:* A year course in elementary Russian, or the equivalent as approved by instructor.

**2-46. Everyday Russian**

Summer, non-credit

GEORGE M. SAHAROV

Accuracy and facility in the use of oral Russian through the use of dictation, conversation and other devices. *Prerequisite:* One year of Russian.

SPANISH

**2-300. Elementary Spanish**

Year, 3 credits each semester

ERWIN JAFFE  
MARJORIE C. JOHNSTON

Foundation work in grammar, vocabulary, reading, and translation.

**2-301. Intermediate Spanish**

Year, 3 credits each semester

FERNANDO R. ROMERO

Grammar review, more difficult reading and translation, use of idioms, writing and discussion in the language. *Prerequisite:* One year of Spanish at college level, or two or three years below college level.

**2-302. Spanish Composition and Conversation**

Year, 2 credits each semester

G. MEDRANO DE SUPERVIA

Thorough training in the structure of the language, through reading and discussion of Spanish newspapers, magazines and novels of today. Writing of compositions, commercial and familiar letters; helping student acquire ability to speak and understand everyday and colloquial Spanish. *Prerequisite:* Intermediate Spanish or equivalent.

**2-574. Advanced Spanish Conversation and Literature**

Year, 2 credits each semester

RAFAEL SUPERVIA

Especially adapted for those having a fair knowledge of the Spanish language, who want to improve it by the readings of and comments on the masters of Spanish literature. *Prerequisite:* Ability to read, understand, and express oneself clearly in Spanish.

**2-47. Everyday Spanish**

Spring, non-credit. Repeated in Summer

ODILON PONCE

Accuracy and facility in the use of oral Spanish will be attempted through the use of dictation, conversation, and other devices. The work will be adapted to those entering the course. The course is designed especially for those who wish to acquire fluency in the spoken language of today. *Prerequisite:* One year of Spanish.

# Mathematics and Statistics

## DEPARTMENTAL COMMITTEE

W. EDWARDS DEMING (Chairman)

JOSEPH F. DALY

HAROLD F. DORN

MURRAY A. GEISLER

MARGARET J. HAGOOD

MORRIS H. HANSEN

EARL E. HOUSEMAN

B. R. STAUBER (Vice-chairman)

## THE STATISTICIAN AND HIS EDUCATION

Unprecedented dependence is being placed on statisticians by administrative officials in government and private business all over the world. The statistician, through his specialized training, is able to provide current and comprehensive information on many subjects, and to do so with speed and economy. His specialized techniques are indispensable in industry.

The making of a statistician is a long and exacting process—several years of graduate study, plus at least a year and a half of high-grade experience under competent leadership. Educational facilities are strained, not only because of the heavy and increasing demand but also because the educational requirements placed on the statistician today are of an entirely different order of magnitude than they were a few years ago.

The courses described on the following pages accordingly provide training not only in theoretical principles, but training also in the administrative and research uses of data, as well as in the collection and processing of data and in the development and supervision of the minor skills necessary for carrying out statistical work.

In the design of a survey the statistician is concerned with the reliability and the cost of the figures that are to be obtained. Reliability is affected by many sources of error, which can be classified under two groups: (a) biases that are common to both complete counts and samples; (b) sampling errors. A thorough understanding of both types of error is essential in the work of the statistician. The statistical courses listed on the following pages deal mainly but not entirely with sampling errors. Proficiency in one or another branch of subject-matter such as sociology, economics, agricultural science, engineering, or some other specialized field, is essential for a full appreciation of the first type of error and for that reason collateral studies in one or more fields of science are advised and in fact are insisted upon in work leading to a Certified Statement of Accomplishment in Statistics.

# CERTIFIED STATEMENT OF ACCOMPLISHMENT IN STATISTICS

A Certified Statement of Accomplishment is offered in each of three fields of statistical study—fields representing areas of statistical preparation and application most useful in the public service. The required program in each field is outlined on page 30. The student who holds a bachelor's degree and who completes the basic courses and earns 24 credits in specialized courses listed in any column, with substitutions only as specifically approved, is eligible to receive a Certified Statement of Accomplishment. It certifies that the student has completed a program of study which, in conjunction with collateral training in a subject-matter field of application, prepares him for effective public service in a particular statistical field.

## INTERNSHIPS IN SAMPLING

### COMMITTEE

W. EDWARDS DEMING (Chairman)

WILLIAM G. COCHRAN

S. MCKEE ROSEN

MORRIS H. HANSEN

IRVING SIEGEL

STERLING R. NEWELL

FREDERICK F. STEPHAN

ARYNESS JOY WICKENS

In recognition of the need for statisticians with thorough theoretical training and with experience in large-scale statistical projects under competent leadership, and in recognition of the exceptional facilities in Washington for specialized training in this field, the Graduate School has undertaken to present to qualified students the opportunity to pursue their studies under a system of internships. Under this program a limited number of qualified persons have a unique opportunity to combine advanced study with practical experience in sampling.

### *Internship Program*

The internships provide opportunity for research work under leading authorities. The program is planned on an individual basis, depending on the experience, training and interests of the candidate. The internships are intended to supplement, not supplant, work offered in universities.

The following agencies have cooperated in the program:

Bureau of Agricultural Economics

Bureau of the Budget

National Bureau of Standards

Bureau of the Census

Bureau of Labor Statistics

National Institutes of Health

National Office of Vital Statistics



# COURSES LEADING TO CERTIFIED STATEMENTS OF ACCOMPLISHMENT IN STATISTICS

(With Concentration in One of the Following Fields of Application)

## THE SOCIAL SCIENCES

College Algebra, Plane Trigonometry and  
Analytic Geometry  
Principles of Statistical Analysis

## THE NATURAL SCIENCES

### BASIC COURSES—Required of all candidates

College Algebra, Plane Trigonometry and  
Analytic Geometry  
Principles of Statistical Analysis

## MATHEMATICAL STATISTICS

College Algebra, Plane Trigonometry and  
Analytic Geometry  
Principles of Statistical Analysis

### SPECIALIZED COURSES

3-206. Calculus  
3-305. Mathematics for Economists  
3-400. Introduction to Mathematical Statistics  
3-405. Introduction to Experimental Statistics  
3-435. Sampling in Social and Economic Surveys  
3-436. Questionnaire Construction and Interviewing  
7-448. Population Statistics I  
7-449. Population Statistics II  
3-520. Government Statistics  
7-645. Mathematical Economics  
7-700. Population Statistics III  
3-708. Linear Algebra  
3-735. Theory of Sample Surveys  
3-753. Recent Changes in Uses and Requirements of Statistical Data

3-206. Calculus  
3-400. Introduction to Mathematical Statistics  
3-405. Introduction to Experimental Statistics  
3-507. Statistical Methods in Engineering and Industrial Production  
3-535. Statistics of Bio-Assay  
5-571. Design and Interpretation of Experiments in Physical Sciences  
1-570. Design of Experiments in Biological Sciences

3-400. Introduction to Mathematical Statistics  
3-500. Advanced Calculus  
3-708. Linear Algebra  
3-710. Applications of Linear Regression  
3-712. Theory of Functions  
3-735. Theory of Sample Surveys  
3-741. Theory and Application of the Characteristic Function  
3-751. Theory of Measure  
3-752. Advanced Theory of Probability

### ELECTIVE COURSES

3-420. History of Mathematics  
3-500. Advanced Calculus  
3-502. Differential Equations

3-712. Theory of Functions  
3-741. Theory and Application of the Characteristic Function  
3-752. Advanced Theory of Probability

The internship consists of two integrated parts:

- (1) classroom training in courses at the Graduate School or at other educational institutions in the city;
- (2) work experience in government agencies on large-scale statistical sampling and testing programs.

*Length:* Twelve or eighteen months; the length of time spent in the internship is determined by the training and experience of the applicant.

*Qualifications:* Doctorate (a) in mathematical statistics, or (b) in a field such as agriculture, business, economics, social psychology, engineering. By arrangement, an intern may combine his internship with work on a doctoral thesis.

### *Selection*

Each application is reviewed and approved or rejected by the Committee on Internships in Sampling. The Committee helps the intern plan his program and consults with him from time to time concerning his progress. Where the intern program is being developed as a research project, serving as a basis for a doctoral dissertation, the Committee keeps the university informed of progress.

### *Stipends*

The internships carry no stipends. The Graduate School makes and offers no living arrangements.

### *Fees*

The only fees charged are nominal course fees for those courses in which the intern is registered.

### *Application*

Address the application to the Director, Graduate School, Department of Agriculture, Washington 25, D. C., and include the following information:

- |   |   |
|---|---|
| (1) Name  | (5) Fields of specific interest and   |
| (2) Date and place of birth                                 | circumstances surrounding   |
| (3) Transcripts of previous academic work                   | application (i.e., purpose, whether applicant would devote full time to internship, etc.) |
| (4) Citations or copies of publications or technical papers |   |

Applications should be submitted well in advance of the beginning of the fall semester in September to insure adequate arrangement of work schedules and course programs.

## MATHEMATICS

**3-1. Review of Freshman Mathematics**

Spring, non-credit

SIDNEY KAPLAN

A review course on the level of freshman mathematics. Algebra, trigonometry, analytic geometry. A brief introduction to the methods of the differential calculus. Emphasis on applications to statistical problems. *Prerequisite:* One year of college mathematics.

**3-2. Review of Calculus**

Fall, non-credit. Repeated in Summer

SIDNEY KAPLAN

Variables, functions, limits, divided differences, derivatives, application of derivatives to geometry, engineering curve fitting and analysis. Transcendental functions, polar equations, differentials, mean value theorem, techniques of integration and engineering application. Series and expansion of functions. *Prerequisite:* Calculus.

**3-102. College Algebra**

Fall, 4 credits. Repeated in Summer

JOSEPH S. RHODES

Fundamental rules of algebra; exponents; logarithms; manipulations with proportions; identities and conditions; solution of equations; binomial theorem; numerical approximations. Uses of symbolic operators. Determinants; solution of equations by the reciprocal matrix. Theory of equations; progression; series. Permutations and combinations. Graphical methods. Emphasis on applications to statistics and the physical sciences. *Prerequisite:* High school algebra and plane and solid geometry.

**3-103. Trigonometry and Analytic Geometry**

Spring, 4 credits

JOSEPH S. RHODES

Basic definitions and uses of trigonometric functions; logarithmic solutions; radian measure; fundamental identities; oblique triangles; polar coordinates, inverse trigonometric functions; complex numbers and De Moivre's theorem; graphs of the functions and the inverse functions; introduction to spherical trigonometry.

Fundamental concepts and formulas; line, circle, parabola, ellipse, hyperbola; transformation of coordinates; polar coordinates; parametric equations; the second and higher degree equation in rectangular coordinates; graphic solution of equations; introduction to solid analytic geometry. *Prerequisite:* College algebra.

**3-206. Calculus**

Year, 4 credits each semester

THOMAS N. E. GREVILLE  
JOSEPH H. KUSNER

First semester: Variables, functions, limits, continuity, derivatives. Applications of the derivative to geometry and physics. Maxima and minima. Differentials. Mean value theorem. Simple integration and applications to geometry and physics. Radius and circle of curvature. Vectors.

Second semester: Standard integral forms. Special methods of integration. Approximate integration. Improper integrals. Indeterminate forms. Taylor's formula with remainder. Infinite series. Partial derivatives. Multiple integrals. *Prerequisite:* Algebra, trigonometry and analytic geometry.



The following two courses form a two-year cycle.

**[3-305.] Mathematics for Economists** (1953-54 and alternate years)

Year, 2 credits each semester

Instructor to be announced

**7-645. Mathematical Economics** (See p. 79)

—O—

**3-345. Higher Algebra**

Spring, 3 credits

SIDNEY KAPLAN

Review of permutations and combinations. Mathematical induction. Binomial theorem for any index. Multinomial theorem. Inequalities. Review of logarithms. Exponential and logarithmic series. Elementary theory of limits. Elementary theory of finite series. Partial fractions. Summation of recurring series. Elementary theory of numbers. Cramer's rule and Aitken's method of pivotal condensation. Doolittle technique. Elementary complex numbers. De-Moivre's theorem. Elementary theory of equations. Cubic, quartic, Newton's method. *Prerequisite:* College algebra and trigonometry.

**[3-420.] History of Mathematics** (1953-54 and alternate years)

Year, 3 credits each semester

DANIEL M. DRIBIN

**[3-430.] Unified Mathematics** (1954-55 and every third year)

Year, 3 credits each semester

MURRAY A. GEISLER

—O—

The following three courses form a three-year cycle.

**3-425. The Fundamental Concepts of Mathematics from an Advanced Standpoint**

Year, 2 credits each semester

JOSEPH H. KUSNER

The purpose of this course is to provide a transition from the approach in elementary mathematics (through differential and integral calculus) to the more mature approach of advanced mathematics. Topics covered include the fundamental concepts of algebra, geometry, analysis, the theory of sets, mathematical logic. *Prerequisite:* Calculus.

**[3-500.] Advanced Calculus** (1953-54 and every third year)

Year, 2 credits each semester

JOSEPH H. KUSNER

**[3-712.] Theory of Functions** (1954-55 and every third year)

Year, 2 credits each semester

JOSEPH H. KUSNER

—O—

The following three courses form a three-year cycle.

**3-502. Differential Equations**

Year, 2 credits each semester (every third year)

OTIS E. LANCASTER

Various types of ordinary differential equations. Solutions in series; the methods of Frobenius and others. Mechanical methods. Partial differential equations. Boundary problems. Fourier series and integrals; Legendre polynomials. Applications to conduction of heat and vibrating strings. Laplace's equation. Calculus will be reviewed as necessary. *Prerequisite:* Calculus.

**[3-706.] Analytical Mechanics (1953-54 and every third year)**

Year, 2 credits each semester

OTIS E. LANCASTER

**[3-715.] Applications in Engineering Mathematics (1954-55 and every third year)**

Year, 2 credits each semester

OTIS E. LANCASTER

## STATISTICS

*Elementary Courses***3-126. Introductory Statistics**

Year, 2 credits each semester. Repeated in Spring and Summer

HARALD C. LARSEN

C. M. PURVES

OTTO RAUCHSCHWALBE

The collection of data. The presentation of data in tables and charts. Different kinds of averages. Dispersion. Introduction to index numbers. Relations between two or more variables. Introduction to correlation theory, regression, and interpretation of samples. Practice in calculations. *Prerequisite:* High school algebra and geometry.

**3-136. Graphic Methods of Presenting Statistics**

Spring, 2 credits

R. G. HAINSWORTH

Analysis of statistical data to determine what form is best for graphic presentation. Application of data to the many types of illustrations in several forms of the various classes. Rough pencil layout examples of time series charts, frequency diagrams, graphic correlation charts, pictorial symbol charts, cartograms and other illustrative examples will be prepared in class. Comparability and evaluation of individual charts and maps in a series will be analyzed. *Prerequisite:* An introductory course in statistics, Elements of Statistical Drafting, or experience approved by the instructor.

**3-251. Review of Statistical Analysis**

Summer, 3 credits

FRANK PROSCHAN

A review of statistical analysis. A practical, experimental approach to fundamentals, requiring a minimum of mathematics. Topics: distributions; various measure of central value and dispersion; statistical inference; analysis of variance; regression and correlation; enumeration statistics; nonparametric statistics.

**3-318. Machine Tabulation**

Fall, 2 credits. Repeated in Spring

MILTON KAUFMAN

The punch-card method. Functions of the principal types of tabulating machines. Operations of the machines are demonstrated. The instruction covers basic wiring of all types of commercial tabulating equipment. *Prerequisite:* General knowledge of tabulating equipment.

**3-319. Advanced Application of Tabulating Equipment**

Fall, 2 credits. Repeated in Spring

MILTON KAUFMAN

The solution of advanced problems in the application of card-tabulating equipment, including the wiring of principal machines involved. *Prerequisite:* A course in machine tabulation and knowledge of the basic wiring of tabulating equipment.

### 3-380. Principles of Statistical Analysis

Year, 3 credits each semester

B. RALPH STAUBER

The purpose of the course is to lay a thorough foundation of the basic concepts and principles of statistical analysis as a method of scientific investigation.

Specifically, the course includes statistical terminology; elementary probability; the binomial, Poisson, and normal distributions; statistical tests of significance; simple and multiple correlation; some theory of determinants with applications to correlation and the inverse matrix; introduction to analysis of variance; introduction to sampling; elementary principles of design and analysis of surveys and experiments; use of statistical tables such as Fisher, Yates, and others. *Prerequisite:* College algebra, plane trigonometry, and analytic geometry; an elementary course in statistics is desirable.

### *Advanced Courses*

#### [3-400.] Introduction to Mathematical Statistics (1953-54 and alternate years)

Year, 3 credits each semester

BENJAMIN J. TEPPING

#### 3-405. Introduction to Experimental Statistics

Year, 2 credits each semester

WALTER A. HENDRICKS

A non-mathematical course in the analysis and interpretation of data from agricultural and biological experiments. Elementary probability relationships; binomial, Poisson, and normal frequency distributions; the concept of sampling error; tests of significance of differences between averages; the chi-square test as applied to differences between observed and expected frequencies; regression and correlation; and elementary discussions of analysis of variance and covariance. Numerical examples. Text: Snedecor, Statistical Methods. *Prerequisite:* College training in agriculture or a biological science; familiarity with ordinary methods of tabulating experimental data, computation of averages and the preparation of graphs.

#### [3-708.] Linear Algebra (1953-54 and alternate years)

Fall, 3 credits

JOSEPH F. DALY

#### [3-710.] Application of Linear Regression (1954-55 and every third year)

Spring, 3 credits

JOSEPH F. DALY

#### 3-735. Theory of Sample Surveys

Year, 2 credits each semester

MORRIS H. HANSEN, WILLIAM N. HURWITZ  
and JOSEPH STEINBERG

History of sampling in social surveys. The use of statistical control in improving the quality and efficiency of the estimates. Calculation of sampling errors. Random, stratified random, purposive, double and systematic sampling. Cost function, choice of sampling unit; size and type of sample necessary to attain a stated degree of precision, and the distinction between precision and accuracy. The theory of probability is developed as necessary. The contributions of Fisher, Neyman, Yates, Cochran, and others are studied. *Prerequisite:* Principles of Statistical Analysis and Calculus.

### 3-741. Theory and Application of the Characteristic Function

Year, 2 credits each semester (every third year)

WALTER JACOBS

Set functions; monotone functions, Stieltjes integrals. The Fourier integral and its transform. Harmonic analysis. The characteristic functions; its moment generating properties; inversion formula; property of continuity. Applications of the characteristic function. *Prerequisite:* Advanced work in statistics; advanced calculus or theory of functions.

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The following four courses form a three-year cycle.

### 3-430. Unified Mathematics

(See p. 33)

### 3-748. Introduction to Mathematical Analysis

Fall, 3 credits (every third year)

MURRAY A. GEISLER

This course is intended to bring the student into contact with the modern concepts and techniques used in the theory of probability and the theory of the integral, as exemplified in the work of Cramer, Frechet, Kolmogoroff, and Saks. Attention will be concentrated on the basic properties of the real number system, elementary operations with point sets, and applications of the idea of topological space to a general treatment of functions, limits, and continuity. The theorems developed will be essentially those invoked in the standard course in advanced calculus. *Prerequisite:* Calculus.

### 3-751. Theory of Measure

Spring, 3 credits (every third year)

MURRAY A. GEISLER

Review of theory of function of a real variable. Point set theory. Riemann integration, Lebesgue measure. Lebesgue and Stieltjes integrals. Applications to the theory of probability. *Prerequisite:* Introduction to Mathematical Analysis.

### [3-752.] Advanced Theory of Probability (1953-54 and every third year)

Year, 3 credits each semester

MURRAY A. GEISLER

—O—

### *Applied Courses*

### 3-025. The Federal Statistical System—Seminar

Fall, non-credit

HARRY ALPERT

The Federal statistical system: its growth, organization, major characteristics and functions. Review and critical analysis of the "Hoover Commission" Task Force Report on the Statistical Agencies of the Federal Government.

A series of four lecture-seminars meeting at 3:30-5:00 P.M. on October 1, October 15, October 29 and November 12. No registration required; no fees charged.

### 3-435. Sampling in Social and Economic Surveys

Fall, 3 credits

HAROLD NISSELSON

Non-mathematical survey of sampling theory and practice. Development of the basic ideas of statistical sampling, with applications in social and economic surveys. Unrestricted random, stratified, systematic, area and cluster sampling,



and subsampling. Sample designs used in the United States and in foreign countries are discussed with respect to considerations of statistical efficiency, cost functions, and the administrative limitations imposed on the design. *Prerequisite*: A course in elementary statistics.

[3-436.] **Questionnaire Construction and Interviewing**  
(1953-54 and alternate years)

Fall, 2 credits

JOSEPH HOCHSTIM

**3-480. Statistical Methods and Experimental Design**

Fall, 12 credits. Repeated in Spring ROY A. CHAPMAN and AUSTIN A. HASEL

Application of statistical methods to research work in the Forest Service stressing the logic of experimentation and the techniques of design, analysis, and interpretation of experiments or surveys. Emphasis is placed on: testing hypotheses in forest research; distribution of sample statistics; tests of significance.

Registration limited to qualified research personnel of the Forest Service.

**3-507. Statistical Methods in Engineering and Industrial Production**

Year, 2 credits each semester (alternate years)

W. R. PABST

First half: Use of statistical methods in analyzing engineering problems, development of sampling plans and tables, acceptance sampling, use of quality control charts.

Second half: Sampling methods for engineering purposes, design of engineering experiments, intensified and sensitivity testing, interpretation of test data, application to specifications. *Prerequisite*: Elementary statistics, a degree in science or engineering, or permission of the instructor.

[3-515.] **Publication of Statistical Reports** (1953-54 and alternate years)

Fall, 2 credits

MORRIS B. ULLMAN and BRUCE L. JENKINSON

**3-520. Government Statistics**

Fall, 2 credits (alternate years)

MORRIS B. ULLMAN

Designed to give acquaintance with the wealth of data available from Federal agencies; methods used by different agencies for the collection of data; comparisons of biases, definitions, and basic concepts; different methods of presentation. The first semester concentrates on limitations inherent in data, the second on sources and uses of data. *Prerequisite*: An elementary course in statistics.

[3-532.] **Survey of Linear Programing** (1953-54 and alternate years)

Year, 2 credits each semester

To be announced

**3-535. Statistics of Bio-Assay**

Fall, 2 credits (alternate years)

JEROME CORNFELD and JACOB E. LIEBERMAN

Biological experimentation including experimentation on sensitization and toxicity; design and analysis of experiments to determine potency, standard error and other parameters of pharmaceuticals compared with standards; dosage-response and dosage-mortality relationships. *Prerequisite*: Elementary statistics, a degree in one of the sciences or equivalent, or permission of the instructor.



**3-560. Theory of Electronic Digital Computing Machines**

Fall, 2 credits

EDWARD W. CANNON

Mathematical requirements for electronic digital computers. Alternative methods of sequencing automatic computers—instruction codes. Electronic computer systems and components—internal memory, control, arithmetic unit, input-output devices. Performance characteristics of electronic computers; analysis of errors. Preparation of problems for machine solution. *Prerequisite:* A bachelor's degree with major in engineering, mathematics, statistics, or physics and Principles of Statistical Analysis or equivalent.

**3-753. Recent Changes in the Uses and Requirements of Statistical Data**

Fall, 1 credit

MORRIS ULLMAN and SPECIALISTS

Significant changes in the uses of data in the nation's industry, government, and research organizations, during the past few years. These changes call for new types and classifications of data, and for new standards and techniques for their collection and interpretation. A series of lectures by authorities in their fields.

**1-570. Design of Experiments in Biological Sciences**

(See p. 16)

**5-571. Design and Interpretation of Experiments in Physical Sciences**

(See p. 55)

**5-572. Experimental Design in Physical Sciences—Seminar**

(See p. 55)

**7-448. Population Statistics I: Basic Sources and Methods**

(See p. 89)

**7-449. Population Statistics II: Intermediate Methods and Applications**

(See p. 90)

**7-700. Population Statistics III: Advanced Analytical Methods**

(See p. 91)

# Office Techniques and Operations

## DEPARTMENTAL COMMITTEE

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## CLERICAL-ADMINISTRATIVE PROCEDURES

The courses described under Clerical-Administrative Procedures are closely related to those offered in the Department of Public Administration and are an integral part of the program leading to the Certified Statement of Accomplishment in Administrative Procedures. They are practical, how-to-do-it, courses chiefly of interest to persons in grade GS-7 positions, or below, who are either working with these procedures, or who hope to train themselves for such positions, or positions requiring some familiarity with more than one of these procedural subjects (e.g., administrative assistants and head clerks). High school graduation is a basic requirement for admission to these courses; exception will be made only on the basis of proven equivalent experience.

## CERTIFIED STATEMENT OF ACCOMPLISHMENT IN ADMINISTRATIVE PROCEDURES

The program leading to a Certified Statement of Accomplishment in Administrative Procedures should be of special interest to:

1. Persons already employed in administrative work of the procedural type, emphasizing techniques and skills.
2. Employees who aspire to enter administrative work but who, because of lack of college education, find their opportunities in that field greatly limited except at the procedural level. This program of courses is useful for persons with good native ability but limited educational background, because it prepares them for a level of work most likely to be open to them. After they have succeeded in getting into administrative work, perhaps even at the clerical-administrative level, they can then combine their work-experience and study-experience to mutual advantage as progress is made toward greater responsibility. This approach is believed to be better for such persons than the common practice of attempting to circumvent the usual educational requirements by shortcut concentration on advanced and specialized courses, which are

actually preparatory for responsible positions only insofar as they *supplement* broader educational background.

3. Employees who wish to prepare to become administrative assistants or to head units concerned with administrative procedures.

### *Requirements*

1. High school diploma or equivalent.
2. Sixteen semester hours of credit with grades of "C" or better in Graduate School courses, distributed as follows:
  - a. A course in American National Government.
  - b. A minimum of eight credits (in addition to *a* above) selected from courses above the 100 level in Clerical-Administrative Procedures, or from courses offered in the Department of Public Administration (excluding all accounting courses except Federal Government Accounting) or a combination of these.
  - c. The remaining credits may be selected from courses, not included above, in the Department of Office Techniques and Operations, excluding all shorthand courses.
  - d. A course in elementary statistics may be included. It is not required. If it is included, three credits may be deducted from *c* above.

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## CLERICAL-ADMINISTRATIVE PROCEDURES

### **4-101. Business Mathematics**

Fall, 2 credits. Repeated in Spring and Summer

RALPH R. BOTTS

Designed for clerical workers who are called upon to apply fundamentals of arithmetic to their jobs. Emphasis will be placed on review of business arithmetic including fractions, ratios, proportion, percentages, common divisors and multiples, progressions and elementary graphs and statistics. Special applications will be made to business problems such as simple interest; simple, bank, cash and trade discount; profit and loss; sales turnover; equation of partial payments and accounts; commuting debts; compound interest; compound discount; and annuities. Use of calculating machine will be explained.

### **4-108. Administrative Procedure**

Fall, 2 credits. Repeated in Spring and Summer

THOMAS J. HICKEY  
RUSSELL O. HESS

Intended for persons who wish to become supervisors or administrative assistants or who are now serving in such capacity in a small organizational unit. Deals with the aspects of the day to day assignments for which these persons ordinarily are responsible, such as preparation of budget data for small organizational units; the proper establishment of authority and responsibility and organization structure; fundamentals of personnel administration; essential requirements for good supervision.

The second part of this course deals with the introduction to administrative planning, administrative procedures and management generally at the lowest

organization level, including work reporting and work measurements, work processes and work control reports; relation of these studies to the budgetary and personnel needs of the unit; and the theory of staff versus operating jurisdiction over administrative planning.

#### **4-110. Federal Auditing Procedure**

Fall, 2 credits

HAROLD J. SELINSKY

This intensive one-semester course is intended for those having no previous knowledge of the subject and is designed to furnish fundamental training for employees now in lower grades as clerks, typists, machine operators, etc., who intend to take the course on Advanced Federal Auditing Procedure or who have opportunities of eventually becoming auditors by serving apprenticeships. It covers explanations of, discussions on and practice work with the two most common types of Government vouchers; deals with, to a limited extent, certain related documents and procedures and should prepare students for higher grades and better-paying positions.

Embraces general and basic principles; definitions of terms, description and use of standard forms involved, authorizations and allocations; general procedure in auditing standard form 1034 vouchers; suspensions and disallowances, General Accounting Office exceptions and replies; purchase order procedure and its relation to auditing; tax exemption procedure and its effect upon auditing; general procedure in auditing standard form 1012 vouchers; authority for travel, emergency travel per diem allowances, method of computation; methods of travel, duty status and leave, application of statutes, regulations and Decisions of the Comptroller General; exigency statements, special correspondence; and practice audit work on standard form 1034 "purchase" vouchers and standard form 1012 "reimbursement" vouchers.

#### **4-112. Federal Accounting Procedure**

Fall, 3 credits. Repeated in Spring and Summer

JOHN L. TIERNEY

Designed particularly to train accounting clerks through instruction of employees now working in lower grades and to assist accounting clerks in present and prospective positions. It embraces explanation of, discussion on, and practice work with the basic ledgers (allotment ledger, objective classification ledger, and general ledger) maintained in connection with funds made available to Federal agencies. Appropriation, apportionment, allotment, disbursement, collection, and reporting processes will be discussed and the relationship between administrative accounts and accounts kept by the Treasury Department and the General Accounting Office explained.

#### **4-113. Federal Property Procedure**

Fall, 2 credits

TONY M. BALDAUF

An elementary course covering principles and procedures in the utilization, accountability, and disposal of Federal personal property. Designed to furnish persons currently employed in this field an opportunity to learn the mechanics of their day-to-day jobs through a short intensive study of the prescribed policies and regulations and accepted practices. Acquaints the student with the essential operations in connection with: property inventorying; accountability records and controls; borrowing and loaning; lost, damaged, or destroyed property; development and application of equipment utilization and replacement standards; transfers and disposals; sales; donations; destruction or abandonment; determination of requirements; management through inventory controls; nomenclature; and statistical reporting of motor vehicle operation.

#### **4-114. Federal Personnel Procedure**

Fall, 2 credits. Repeated in Spring and Summer

VERNA C. MOHAGEN

Deals with the elementary principles and procedures of Federal personnel administration, including a study of the Federal personnel structure and organi-



zation, history and progress of the merit system, rules and regulations of the Civil Service Commission, and other basic procedural sources; use of personnel forms and records; Civil Service examinations and recruitment; appointments; transfers; promotions; separations and reductions in force; suspensions and disciplinary actions; retirement; performance ratings; leave and hours of duty; personnel reports, applications of Decisions of the Comptroller General, administrative policy statements, and administrative orders.

#### **4-115. Federal Purchasing Procedure**

Year, 2 credits each semester

TONY M. BALDAUF

This course is designed to assist employees, who are engaged in purchasing work or wish to get into it, in learning the detailed requirements of laws, regulations, and procedures applicable to procurement from Federal sources of supply and purchasing or contracting for supplies and services in the open market; the practical application of such requirements through the preparation of procurement and related documents covering the more common types of transactions; and solution of problems pertaining thereto. The fall semester is devoted to those phases having general application to purchasing and contracting but more specifically to procurement from Federal sources of supply and purchasing not requiring the solicitation and acceptance of bids.

The spring semester is devoted to acquiring knowledge of basic laws, regulations, and procedures needed in making the simpler contracts arising from competitive bidding or negotiation, with special attention given to the latter as authorized by the Federal Property and Administrative Services Act of 1949.

#### **4-116. Federal Budgetary Procedure**

Fall, 2 credits. Repeated in Spring

CHARLES L. GRANT

JESSE B. MCWHORTER

This course is designed to assist employees either in budget work or preparatory to taking budget work, up to and including Grade GS-9. It deals with budgetary procedures, including the preparation of estimates, justifications, tabular statements, graphs, etc., and, in connection with budget execution, outlines methods in making allotments, preparation of apportionment and obligation reports, and other methods used in the formulation and execution of the Federal budget.

#### **4-117. Records Management Procedure**

Fall, 2 credits

DOROTHY M. LUTTRELL and ROBERT H. LANDO

A course of instruction in how to process, maintain and service records, designed for students who desire to enter the records management field or who are interested in supplementing their knowledge of the mechanics and techniques of record operations. Includes detailed instructions in methods of (1) recording and controlling communications, (2) classifying, coding and indexing correspondence and other record material, (3) filing records and references, and (4) furnishing records reference service, including the establishment and operation of charge-out and follow-up systems. This course also provides study and discussion of (1) the theory and structure of the various systems of classification and filing, (2) the selection of the proper systems of classification for individual requirements, and (3) the development of individual classification and filing patterns.

#### **4-201. Supervision**

Fall, 2 credits. Repeated in Spring and Summer

EARL D. SHARAR

A course for persons who have or expect to have first-line supervisory responsibilities. Particular emphasis will be placed upon the need for understanding human behavior and attitudes as they manifest themselves in group efforts. The dynamic setting in which supervisory responsibilities are discharged, its im-



portance to management, the individual qualities and specific techniques employed by supervisors to improve work methods will be considered, and a program of self-development and self-evaluation in the art of supervision suggested.

#### **4-208. Advanced Administrative Procedure**

Fall, 2 credits. Repeated in Spring

SIDNEY J. ADAMS

Intended for persons who are now assigned to administrative assistant and supervisory positions. Deals with (1) the conduct of administrative and procedural surveys and audits directed toward the development of factual data for management purposes; the analysis of these data, the preparation of reports and recommendations thereon; (2) the putting into effect of the approved recommendations through the actual drafting of procedural instructions and the designing and standardization of forms; (3) the installation of approved procedures and the establishment of executive controls to insure compliance with approved instructions; (4) the modern and tested techniques and methods ordinarily used in developing factual data and graphic presentations regarding flow of work, organization structure, work assignments, authority, work duplications, delays and bottlenecks; (5) report writing; (6) the value of illustrated presentations of work processes in eliminating duplication of work, in simplifying operations and in cutting out unnecessary steps; (7) the value of and the need for specific written manuals of instructions as tools of management; and (8) the relation of these instructions to those taught in the other Office Techniques and Operations Courses. *Prerequisite:* Completion of one of the following courses in Office Techniques and Operations: 108, 110, 112, 113, 114, 114, 116, 117, 201; or Course 344, Introduction to Public Administration.

#### **4-210. Advanced Federal Auditing Procedure**

Spring, 2 credits

EMMETT B. COLLINS

Includes explanations of and discussion on Federal auditing policy and practice along advanced lines. Covers the relationship of auditing to general fiscal control; administrative examination of fiscal documents; application of legislation and regulations; use of Comptroller General Decisions; relation of Comptroller General's Decisions to particular cases; normal methods of handling suspensions, disallowances, certifications, etc.; unusual problems in the audit of standard form 1034 vouchers and 1012 vouchers; relationship of procurement to auditing and the policies followed in the use of purchase orders; authority for travel and policies relating thereto; per diem allowances and computations, and policies respecting rates; transportation of property and personnel, use of transportation requests and bills of lading; audit of transportation vouchers; audit of payrolls and application of payroll procedures; General Accounting Office exceptions and preparation of replies; claims, adjustments and direct settlements. This advanced course in Federal Auditing Procedure is designed to assist auditors to prepare themselves for more responsible and more remunerative positions. *Prerequisite:* Federal Auditing Procedure or equivalent experience.

#### **4-214. Advanced Federal Personnel Procedure**

Fall, 2 credits. Repeated in Spring

EUGENE J. PETERSON

Similar to Federal Personnel Procedure but more intensive in its treatment of certain phases of the subject. Deals with advanced principles and techniques in Federal personnel procedures and their relation to operating programs, including a study of the principles of the Civil Service Act, Rules and Regulations, and their application to day-to-day problems in a Federal personnel office; recruiting sources for Civil Service examinations and appointments; study of promotion-from-within procedures; reduction-in-force procedures, and their application to specific operating situations; study of procedures for systematic retirement of employees reaching annuity age; procedures for investigation and enforcement of discipline; periodic reports and their use for operating purposes; procedure

and policy statements in the general field of personnel administration; procedural source materials such as the Civil Service Commission, Federal Personnel Manual, Decisions of the Comptroller General, Executive Orders, etc., and applying them to detailed operating procedures; relationship of the personnel office to budget, accounting, payrolling, and other staff functions. *Prerequisite:* Federal Personnel Procedure or equivalent practical experience in a Federal personnel office at Grade GS-4 or above.

#### **4-217. Advanced Records Management**

Spring, 2 credits

DOROTHY M. LUTTRELL and ROBERT H. LANDO

Designed to give the student a comprehensive knowledge of the management of Government records. Includes a detailed study of the requirements of the Federal Records Law and action necessary for meeting the requirements of this law; the application of management techniques to the creation, maintenance, utilization, preservation and disposition of records. Also includes a discussion of laws and regulations governing the preservation and disposal of records, appraisal, systematic retirement, storage, disposal and microphotography; the development and application of records retention and disposal standards. *Prerequisite:* Records Management Procedure or consent of instructor.

#### **4-413. Office Management**

Fall, 2 credits. Repeated in Spring

DANIEL M. BRAUM

Designed to give supervisors and administrative assistants familiarity with the fundamental principles and methods needed by them to do a satisfactory management or supervisory job. Deals with the common day to day administrative problems and questions encountered by supervisors such as, (1) determination of space requirements and proper space allocation with due regard to flow of work; (2) the utilization and care of all existing facilities—equipment, labor saving devices, communications, etc.; (3) discussion of the effect of heat, light and ventilation on the morale and output of employees; (4) development and use of management tools in the Federal Government; (5) planning for improvements—how to secure participation by officials, supervisors and employees in suggesting and making improvements; and (6) a treatment of many management aides and devices not specifically covered in other Graduate School courses.

### **GOVERNMENT LETTER AND PROCEDURE WRITING**

#### **4-120. Government Letter Writing**

Fall, 2 credits. Repeated in Spring and Summer

VERNE L. SAMSON

The writing of clear, accurate, concise, courteous letters and memoranda contributes to efficiency and economy in administration. This course gives the student (1) opportunity to work out the principles of effective letter writing; (2) practice in criticizing and revising outgoing correspondence, and in planning and drafting replies to incoming letters; and (3) drill in the fundamentals of good writing.

#### **4-420. Procedure or Directive Systems**

Fall, 2 credits

TEN M. F. ALLSMAN and SARAH L. AMES

A study of the various types of procedure or directive systems. Special attention is given to the basic elements of a flexible system and methods of revising procedures, definitive distribution, and improved reproduction processes. Technical procedures functions such as codifying and indexing, development of standards for editing and format, and types of visual presentations are included. The purpose of the course is to provide a technical background for developing

and evaluating various procedure systems and to provide techniques for installing and operating effective systems for directives or procedures.

#### **4-421. Writing Procedures and Instructions**

Spring, 2 credits

TEN M. F. ALLSMAN and KAY PEARSON

A course of instruction in how to develop and write manual issuances, circulars, office memoranda, and other forms of rules, regulations, instructions, and procedures. Special attention will be given to ways of improving readability of such material, the use of a clear, simple style of writing, proper format, and use of "ready-reference" aids. It will provide drill in the practical application of principles and theories of procedure to actual writing. The purpose of the course is to provide students with group experience in writing procedures and instructions and in applying editorial and format standards. *Prerequisite:* Procedure Systems and Methods of Developing Instructions or one year of experience in writing procedures at Grade GS-5 or above.

#### **4-422. Systems for Reports and Forms Management**

Fall, 2 credits

TEN M. F. ALLSMAN and HARRY M. BELL, JR.

Designed to provide students with a comprehensive knowledge of forms and reports management systems and how to operate them. A study of: various systems used for controlling forms and reports; different techniques used in Government for forms design and format; standards and printing specifications; methods for analyzing forms and reports; and how to install and operate forms and reports management programs. Analysis of forms and reports by case studies with group discussion of techniques involved. Special lectures by top technicians from representative Government departments.

### **SECRETARIAL PRACTICES**

#### **4-325. Effective Secretarial Practices**

Fall, 3 credits

ELLEN S. GROFF

A course of study presenting an analysis of the secretarial profession, stressing the general duties required of a secretary, the development of a secretarial personality and occupational intelligence, with practical and realistic discussion of secretarial procedures. Special emphasis placed on modern alphabetical filing system and dictation of business letters. For secretaries and stenographers in government and private industry.

### **SHORTHAND**

These courses are designed to furnish Federal employees an opportunity to follow a program of training for stenographic careers in the Federal service. While each course represents a separate unit of study, with emphasis on material used in the Federal service, a proper sequence of courses insures a sound foundation for successfully qualifying for the various grades and classifications of stenographers in the Federal service.

"Review of Gregg (Anniversary)" will serve as rapid review for the student who has not applied his shorthand knowledge for a long time, or has used it so little that he feels uncertain about applying his knowledge to practical office dictation. Students wishing a review of Gregg Simplified should enroll in "Gregg, 60 to 80 Words."



"Gregg, 100 to 130 Words" is an intensive course on technical material. Students should have a sound foundation in theory and be able to write 100 words a minute with a 95 percent accurate transcript before registering for the course.

The three courses in Reporting Shorthand are open to stenotypists as well as Gregg writers.

Home study is required in all the courses to attain goals set in course descriptions. Amount of study required varies according to the learning habits and individual goals of students.

A prerequisite for all shorthand courses is the ability to type-write with a fair degree of accuracy and speed.

As a general guide to assist employees who wish to plan a course of study to build for a stenographic or stenographic-reporting career in the Federal service the following parallels are drawn:

<i>Course</i>	<i>Goal</i>	<i>Prerequisites</i>
Gregg Shorthand Simplified I	Ability to apply all the basic principles of Gregg Shorthand Simplified; mastery of all the brief forms; ability to read shorthand plates at a fairly rapid rate; ability to write legible outlines and to take dictation of new and practiced material.	For those who have not studied shorthand, or for those who have some knowledge of shorthand but have not completed basic theory.
Gregg Shorthand Simplified II	An increasing mastery of principles of Gregg Shorthand Simplified (by review and drill); ability to construct new shorthand outlines; ability to take dictation of new standard material at a minimum of 60 words a minute and to produce accurate transcripts.	For those who have completed Gregg Shorthand Simplified I or its equivalent.
Gregg Shorthand Simplified, 60 to 80 Words	Theory review; ability to take dictation at 80 words a minute for 5 minutes; ability to produce acceptable transcripts of letters and reports dictated at rates varying from 60 to 80 words a minute.	For those who have completed Shorthand I and II or equivalent theory and dictation courses and who have a minimum speed of 60 words a minute on new, standard material.
Gregg Shorthand, 80 to 100 Words	Ability to take dictation of new, standard material at 100 words a minute for 5 minutes; ability to produce, at a good rate of speed, accurate transcripts of letters, reports, conferences, and telephone conversations.	For those who have a minimum dictation speed of 80 words a minute using either the Simplified or Anniversary system and who are able to produce accurate transcripts of letters and reports.

<i>Course</i>	<i>Goal</i>	<i>Prerequisites</i>
Gregg Shorthand, 100 to 130 Words	Ability to take dictation of new, standard material at 130 words a minute for 5 minutes; ability to produce, at a good rate of speed, accurate transcripts of letters, reports, conferences, and telephone conversations.	For those who have a minimum dictation speed of 100 words a minute and who are able to produce accurate transcripts of letters and reports.
Introduction to Reporting—Gregg, 130 to 150 Words	Ability to record conferences and hearings 60 to 70 percent verbatim; introduction to reporting techniques.	For those who have qualified on 130-word a minute standard tests or their equivalent. Open to stenotypists.
Reporting—Gregg, 150–175 Words	Ability to use high-speed short-cuts and advanced reporting methods; verbatim reporting of lectures, hearings, and conferences.	For those who have qualified on 150-word a minute standard test or the equivalent. Open to stenotypists.
Reporting—Gregg, 175–200 Words	Ability to use high-speed short-cuts and advanced reporting methods; verbatim reporting of lectures, hearings, and conferences.	For those who have qualified on 175-word a minute standard test. Open to stenotypists.

#### **4-89. Review of Gregg Shorthand (Anniversary)**

Fall, non-credit. Repeated in Spring and Summer.

VIVIAN W. FLINCHUM

A review of theory and brief forms. Reading from shorthand plates and students' own notes; dictation of standard material at various progressive rates of speed. *Prerequisite:* Completion of the Gregg Manual or its equivalent by the Anniversary system.

#### **4-129. Gregg Shorthand Simplified I**

Fall, 3 credits. Repeated in Spring and Summer

NEVA I. TAYLOR  
KATHRINE WILKEY

#### **4-130. Gregg Shorthand Simplified II**

Fall, 3 credits. Repeated in Spring and Summer

MARGARET O. HOBBS  
NEVA I. TAYLOR  
KATHRINE WILKEY

#### **4-225. Gregg Shorthand Simplified, 60 to 80 Words**

Fall, 3 credits. Repeated in Spring and Summer

E. DONALD BELL

#### **4-226. Gregg Shorthand, 80 to 100 Words**

Fall, 3 credits. Repeated in Spring and Summer

RALPH ROWLAND

#### **4-231. Gregg Shorthand, 100 to 130 Words**

Fall, 3 credits. Repeated in Spring

MARIAN I. HARLIN



**4-335. Introduction to Reporting—Gregg, 130 to 150 Words**

Fall, 4 credits. Repeated in Spring

FRANCES A. BUTLER

**4-336. Reporting—Gregg, 150 to 175 Words**

Fall, 4 credits. Repeated in Spring

EUDORA K. BERNARD

**4-337. Reporting—Gregg, 175-200 Words**

Fall, 4 credits. Repeated in Spring

JACK ROMAGNA

## Physical Sciences

### DEPARTMENTAL COMMITTEE

ELSA O. KEILES (Chairman)

S. W. BOGGS

L. W. CURRIER

ARNOLD J. LEHMAN (Vice-chairman)

HARRY WEXLER

JOSEPH B. LEVY

MARK L. NICHOLS

HENRY STEVENS

—O—

The courses in this department offer unusual opportunities for study under the guidance of scientists working in this field. The program will be of value to students who plan to enter these sciences; to those who desire to increase their knowledge of the science in which they now earn their living; and to those who wish, for cultural reasons, to learn more about these fields.

Most of the courses in this department are seminars designed to keep professional workers informed of recent developments in their fields and do not include laboratory work. A few of the courses offer basic training and, as indicated in the course descriptions, include laboratory work.

—O—

## CHEMISTRY

### 5-248. Organic Chemistry

Year, 4 credits each semester (alternate years)

ROBERT G. WILLIAMSON

A study of the fundamental principles of organic chemistry, including electronic structure of organic compounds, resonance, classification, nomenclature, and type reactions. Emphasis is placed upon the importance of carbon compounds in present-day civilization (industry, chemotherapy, and biochemistry). The laboratory work consists of acquiring organic techniques, preparing typical compounds, and studying their characteristic reactions. The class meets in the Chemistry Laboratory of Wilson Teachers College, 11th and Harvard Streets, N. W. *Prerequisite:* General college chemistry.

### 5-312. Food Technology—Fruits and Vegetables

Spring, 2 credits

LOWRIE M. BEACHAM

Basic principles of the chemistry of fruits and vegetables with special reference to their preservation by canning, freezing, drying, etc., and with emphasis on the requirements of the Federal Food, Drug, and Cosmetic Act. Variety and stage of maturity as related to the provisions of applicable standards of identity, quality, fill of container, and other official grades. Chemical and physical methods of measuring maturity and quality factors. Permitted flavoring, seasoning, and stabilizing ingredients. Chemical preservatives. Desirable and undesirable changes resulting from preservative processes. Advantages and limitations of various methods of preservation. Choice of methods with various classes of material. *Prerequisite:* Inorganic chemistry; a course in organic chemistry is desirable.

**[5-315.] Elementary Biochemistry** (1953-54 and alternate years)

Year, 2 credits each semester

SIDNEY M. HESS

**[5-349.] Physical Chemistry** (1953-54 and alternate years)

Year, 2 credits each semester

WILLIAM HORWITZ

**[5-400.] Advanced Organic Chemistry** (1953-54 and alternate years)

Year, 2 credits each semester

WILBUR I. PATTERSON

**5-425. Chemistry in Foods**

Fall, 2 credits

JACK L. RADOMSKI

The chemistry, pharmacology and toxicology of emulsifiers, wetting agents, preservatives, pesticides, flour improvers, food colors, flavoring agents, artificial sweeteners, vitamins, and minerals. Methods of evaluating the safety of these substances. *Prerequisite:* Undergraduate courses in chemistry and biology.

**5-515. Physical Biochemistry**

Year, 2 credits each semester (alternate years)

WILLIAM HORWITZ

A survey of basic physical chemical topics governing metabolic processes including thermodynamics, solutions, equilibrium, kinetics, pH, buffer systems, oxidation-reduction systems, membrane phenomena, and related topics. *Prerequisite:* Physical chemistry and elementary biochemistry.

**5-522. Advanced Biochemistry**

Year, 2 credits each semester (alternate years)

SIDNEY M. HESS

A detailed study of behavior and properties of vitamins, hormones and enzymes; the nature of biological catalysis; hydrolytic, phosphorolytic, and oxidizing enzymes; intermediary metabolism of amino acids, carbohydrates, and fats; and related subjects. *Prerequisite:* Elementary biochemistry or consent of the instructor.

**5-540. Introduction to Chemical Kinetics**

Fall, 2 credits (alternate years)

JOSEPH B. LEVY

A simple and balanced account of the general principles of chemical kinetics and its experimental application. The fundamental theories of reaction rates examined in a non-mathematical fashion. The characteristics of gas phase reactions and reaction in solution from the point of view of kinetics with greater emphasis on the gas phase. *Prerequisite:* Undergraduate course in physical chemistry.

**5-541. Theoretical Organic Chemistry**

Spring, 2 credits

JOSEPH B. LEVY

The theoretical aspects of organic reactions. Includes the theory of resonance aromatic substitution and in general the principles which govern and explain the way organic reactions occur. *Prerequisite:* Undergraduate course in organic chemistry.

**[5-542.] Physical Organic Chemistry** (1953-54 and alternate years)

Fall, 2 credits

JOSEPH B. LEVY

**5-545. Alkaloids, Glucosides, and Toxins of Biological Importance**

Spring, 2 credits (alternate years)

GEOFFREY WOODARD and SPECIALISTS

Subject matter covers items such as morphine, nicotine, ergot and quinine (cinchonidine) alkaloids; cardiac glycosides; snake venom, mushroom, honey and shellfish toxins; and toxins of bacterial origin. Emphasizes the relation of chemical structure to biological activity and methods of analysis, either chemical or biological. *Prerequisite:* Degree in biology or chemistry, or equivalent; knowledge of organic chemistry desirable.

**[5-550.] Pharmacology of Insecticides (1953-54 and alternate years)**

Spring, 2 credits

BERNARD DAVIDOW

**5-625. Specialized Analytical Techniques**

Fall, 2 credits

GEOFFREY WOODARD and STAFF

A detailed discussion of some of the physical methods used in analytical work for determination, separation, or identification, particularly of organic compounds. Among the methods covered are ultraviolet, visible, and infrared spectrophotometry, partition, adsorption, and paper chromatography, and counter current distribution. Emphasis is placed on practical applications. Laboratory demonstrations are included where possible.

**5-630. Enzymatic Basis of the Pharmacological Action of Drugs**

Fall, 2 credits (alternate years)

CARTER D. JOHNSTON and STAFF

Enzymatic studies in relation to the effects of cardiac drugs; parasympathomimetic and parasympatholytic drugs involving cholinesterase; natural and synthetic drugs producing antithyroid effects; vesicants; metabolic stimulants; and metabolite inhibitors. *Prerequisite:* Undergraduate degree in biology or chemistry, or equivalent.

**8-188. Glass Blowing**

(See p. 105)

**GEOLOGY**

The following courses in geology are offered in cooperation with the United States Geological Survey and will be given in its well equipped laboratories. They are designed strictly for graduate students, and will enable employees to continue geologic studies while stationed in Washington. However, registration in these courses is not limited to employees of the Geological Survey.

The prerequisite for enrollment is a bachelor's degree in geology or the equivalent as an undergraduate major in geology from an acceptable institution; within this background, specific prerequisites are indicated under the course descriptions.

**[5-435.] Elements of Physical Geology (1953-54 and alternate years)**

Fall, 3 credits

MEYER RUBIN

**[5-641.] Advanced Dynamic Geology (1953-54 and alternate years)**

Spring, 3 credits

Instructor to be announced

**5-642. Advanced Structural Geology**

Spring, 3 credits (alternate years)

Instructor to be announced

Deformational patterns of the earth's crust; history and types of mountain building with regional emphasis; correlation of major and minor structural elements; mechanics of deformation in competent and incompetent rocks; and similar topics of fundamental nature. *Prerequisite:* Bachelor's degree in geology, with courses in general and historical geology, mineralogy, petrology and structural geology.

**GEOGRAPHY****5-420. Physiography of Eastern United States**

Fall, 2 credits (alternate years)

ESTHER J. ABERDEEN

A survey of the physiographic provinces and sections of the United States lying east of the Great Plains. The work of the course includes lectures, informal discussions, reviews of significant papers, and map studies, with special emphasis on the geologic foundations of land forms. *Prerequisite:* Courses in physical and historical geology.

**[5-421.] Physiography of Western United States (1953-54 and alternate years)**

Fall, 2 credits

ESTHER J. ABERDEEN

**SOIL SCIENCES****5-156. Soil Conservation**

Spring, 2 credits

J. GORDON STEELE

A practical course about soil conservation farming. Why we need to conserve soil. What happens to water on the land and in the soil. Changes in soils due to erosion, deposition, leaching, and depletion. Changes due to cropping and grazing, including changes in structure, permeability, and fertility. Long-time changes in soil development compared with short-time changes. Practices for maintaining soil and controlling runoff and erosion. Influence of soil, slope, and climate on capability of land for crops, grazing, woodland, and other uses. Selecting land uses and conservation practices that fit land capability and that fit together in a practical, basic farm or ranch conservation plan. The work of soil conservation districts.

**5-405. Soils—Their Origin and Geography**

Spring, 3 credits (alternate years)

CONSTANTIN C. NIKIFOROFF

A descriptive course covering the basic principles of the origin of the soil as a function of the environment and the pattern of distribution of various soils throughout the world. The role of soil formation in broad geochemical and geophysical cycles and the geographical factors of soil formation such as climate, relief, and biological pressure are first discussed in non-technical terms, followed by several lectures dealing with the physical nature of soil and the geographical analysis of the soil pattern of various parts of the world. The dynamic nature of soils and relationships between soils, climate and vegetation are emphasized throughout the course. *Prerequisite:* Freshman chemistry or its equivalent. Previous training in plant ecology, physical geography, and climatology is desirable.



**[5-531.] Soils: Their Morphology, Genesis, and Classification (1953-54 and alternate years)**

Spring, 3 credits

CONSTANTIN C. NIKIFOROFF

**5-560. Soil Physics**

Fall, 2 credits (alternate years)

C. S. SLATER

Deals with the physical properties of soils of importance to agriculture. Basic physical laws are applied to interpret soil phenomena. Topics include the soil entity, colloids, air and water relationships, structure, measurement of physical properties, relation of such properties to agricultural productivity, erosion and runoff, and modification of soil physical properties through use. *Prerequisite:* Degree in one of the sciences with courses in physics and chemistry, or permission of the instructor.

**METALLURGY**

**5-453. Principles of Process Metallurgy**

Fall, 2 credits

BLAKE M. LORING

The winning of metals from ores; geographic distribution; methods of reduction, refining, and purification; time required for construction and operation of metallurgical plants; allied industries; skills required; power consumption; alternative methods; efficiency and quality. Existing and proposed methods for production of iron and steel, copper, lead, zinc, and other metals. *Prerequisite:* College degree recommended; course in elementary chemistry required.

**5-528. Principles of Engineering Alloys**

Spring, 2 credits

BLAKE M. LORING

Manufacture, heat treatment, and special characteristics determining usage and availability of plain carbon steel, special steels, and non-ferrous alloys such as aluminum, magnesium and titanium. *Prerequisite:* Degree in engineering.

**METEOROLOGY AND HYDROLOGY**

**5-162. Principles of Meteorology**

Spring, 2 credits

ALBERT V. CARLIN

A non-technical course designed for persons interested in the general aspects of weather and for those concerned with the application of weather to their particular field of study.

The first part of the course includes weather instruments and observations, the properties, processes and general circulation of the atmosphere, storms, and climatic conditions of the United States. The use of daily maps and forecasts is discussed.

The second part is a survey of the effect of weather and climate on man and his activities, including agriculture, aviation, transportation, public utilities, business, industry, health and recreation.

**5-310. Methods in Climatology**

Fall, 2 credits

H. C. S. THOM

A study of modern climatological methods with emphasis on statistical analysis as applied to meteorological data. *Prerequisite:* A knowledge of elementary statistics.

**5-415. Applied Climatology**

Fall, 3 credits

WOODROW C. JACOBS

Course consists of a study of modern climatological methods as applied to the weather problems of business, industry and agriculture. A knowledge of the basic principles of meteorology is required but the essential statistical and climatological tools are developed within the course. Special problems are assigned in lieu of laboratory work. *Prerequisite:* A knowledge of elementary statistics is helpful but not required.

**5-533. Hydrology**

Year, 3 credits each semester (alternate years)

MAX A. KOHLER

A two-semester course in basic and applied hydrology at the professional level. The first semester will be largely descriptive, covering such topics as elementary hydraulics; measurement and interpretation of streamflow, precipitation and other basic data; the hydrologic cycle; physics of soil moisture; the infiltration theory; wave travel and the unit hydrograph. The second semester will cover the development and application of procedures for applying basic hydrology to practical problems of river forecasting and design of water control works including such subjects as streamflow routing, flood frequency, the rational method of estimating flood magnitude, hydrometeorology, forecasting of runoff, influence of water control structures on streamflow, and problems of water control operation. *Prerequisite:* Physics and algebra; elementary meteorology, statistics, and engineering desirable.

**5-534. Introduction to Dynamic Meteorology**

Year, 2 credits each semester (alternate years)

Instructor to be announced

Designed to illustrate the use of higher mathematics and physics in the interpretation of meteorological phenomena, and in the development of forecasting techniques. *Prerequisite:* Calculus, or consent of the instructor.

**5-535. Elements of Fluid Mechanics**

Year, 2 credits each semester

MORRIS TEPPER

A basic one year course in the foundation of fluid mechanics aimed at giving the student a physical feeling for the more important concepts and relationships involved in problems concerning the flow of fluids. Topics will include: Flow models, basic concepts such as density, pressure, vorticity, viscosity, capillarity, etc., conservation laws, Bernoulli's equation, dimensional reasoning, characteristic parameters such as Froude number, Reynolds number and Mach number, potential flow, surface waves, elements of viscous flow and an introduction to compressible flows. *Prerequisite:* College physics and mathematics through differential and integral calculus.

**5-536. Physical and Synoptic Meteorology**

Year, 3 credits each semester (alternate years)

FREDERICK G. SHUMAN

A two-semester course in the fundamentals of modern meteorology for the professionally interested student. The first semester stresses the physical aspects—atmospheric composition and structure and their measurement; gas laws; adiabatic, pseudo-adiabatic, and non-adiabatic processes; thunderstorms; fog; wind. The second semester stresses synoptic features—general and local circulations, air masses, fronts, cyclones and anticyclones, upper-air charts, forecasting. Problems involving basic units and graphic manipulations will be assigned. *Prerequisite:* Physics and algebra; trigonometry and elementary meteorology desirable.

**5-537. Weather Analysis and Forecasting**

Year, 3 credits each semester (alternate years)

THOMAS I. GRAY, JR., and JAY S. WINSTON

The principles of air mass and frontal analysis are applied to the analysis and prognosis of sea level and upper air weather charts for North America and

adjacent areas. Standard forecasting methods are discussed, including objective forecasting techniques and forecasting with the aid of upper air data. Short range forecasts (up to 48 hours) are prepared for local and regional areas of the United States. Lecture and laboratory. *Prerequisite:* Physical and Synoptic Meteorology or consent of instructor.

**[5-538.] Elements of Dynamic and Synoptic Climatology**  
(1953-54 and alternate years)

Spring, 2 credits

WOODROW C. JACOBS

**5-548. Atmospheric Radiation**

Spring, 3 credits

LEWIS D. KAPLAN

An introduction to the fundamental principles of radiative heat transfer and their application to atmospheric processes. Among the topics discussed are: kinetic theory of gases, radiation laws, nature of the absorption spectra of gases, variation of absorption with temperature and pressure, determination of albedo and the solar constant, radiation diagrams, greenhouse effect, heat balance of the atmosphere, calculation of nocturnal cooling of ground and clouds. *Prerequisite:* Dynamic Meteorology or Calculus.

**[5-580.] Advanced Weather Analysis and Forecasting** (1953-54 and alternate years)

Year, 3 credits each semester

THOMAS I. GRAY, JR., and JAY S. WINSTON

**5-705. Selected Topics in Meteorology**

Year, 3 credits each semester

JAY S. WINSTON and OTHERS

An advanced seminar course designed to cover various aspects of the current state of meteorology. Review and discussion of articles from the Compendium of Meteorology and other sources. The topics covered are agreed upon by students and instructor. *Prerequisite:* Physical and Synoptic Meteorology, Dynamic Meteorology, or consent of the instructor.

## OCEANOGRAPHY

**5-360. General Oceanography**

Fall, 2 credits

RICHARD C. VETTER

A descriptive lecture course covering the characteristics of the oceans and the factors that control the distribution of properties and of plants and animals. Includes the physics, chemistry, geology and biology of the oceans. *Prerequisite:* College courses in at least two of the physical or biological sciences.

## DESIGN OF EXPERIMENTS

**[5-571.] Design and Interpretation of Experiments in Physical Sciences** (1953-54 and alternate years)

Fall, 2 credits

GLENN L. BURROWS

**5-572. Experimental Design in the Physical Sciences—Seminar**

Fall, 2 credits

GLENN L. BURROWS

Discussions of problems in experimental design in chemistry, physics, and engineering. *Prerequisite:* A degree in one of the sciences or engineering; knowledge of elementary statistics.

# Public Administration

## DEPARTMENTAL COMMITTEE

EARL W. LOVERIDGE (Chairman)

GLADYS L. BAKER

K. A. BUTLER

H. DEAN COCHRAN

ROWLAND EGGER

PATTERSON FRENCH (Vice-chairman)

WILLIAM A. MINOR

HARLOW S. PERSON

JOHN H. THURSTON

## OPPORTUNITIES FOR STUDY AND WORK

The importance of public administration is apparent in the modern state with its emphasis on services, control, operation, and collective action in the public interest. The more the public service is called upon to assume functions previously exercised by individuals or private enterprise the greater the importance of the principles and techniques of public administration. Management problems raised by the war and its aftermath illustrate the critical need for more and better training in public administration, particularly in the junior and assistant positions, even in normal times. The increasing delegation of discretion to administrative agencies has raised unprecedented problems of organization, public consent, and administrative responsibility.

Washington is of necessity the national focal point of all these developments. Many of the ablest and most experienced public administrators are assembled in Washington. Many of the most competent practitioners of the various specialized branches of administration are likewise concentrated in Washington. Utilizing this unique environment and this unexcelled talent, the Graduate School offers courses geared to demonstrated needs and taught by experienced administrative personnel.

## CERTIFIED STATEMENTS OF ACCOMPLISHMENT IN PUBLIC ADMINISTRATION

### COMMITTEE

GLADYS L. BAKER (Chairman)

PATTERSON FRENCH

JOHN H. THURSTON

Certified Statements of Accomplishment are granted to undergraduate and to graduate students who have completed an organized course of study in public administration intended to provide basic training for responsible administrative work.

The programs leading to a Certified Statement of Accomplishment in Public Administration should be of special interest to:



1. Persons already employed in responsible administrative positions. Included in this group are many with specialized training who have been transferred to administrative positions from professional positions without training or previous experience in administration.
2. Junior Management Assistants. Those who entered the service with a management option may profit from courses both more advanced and more specialized than those taken in college. Those who entered on various professional options and are now employed in such professions can profit very greatly from these courses if they expect, or wish to prepare, to enter into administrative work connected with their professional fields.
3. Employees who wish to broaden their understanding and improve their efficiency through a "tour of duty" by study, in lieu of an actual tour of duty for which they have found no opportunity.
4. Employees with college background who aspire to transfer to a career in administrative management.
5. Administrative assistants and administrative technicians of all kinds.

#### *Requirements—Undergraduate Study*

*Students seeking this statement should consult with the Registrar and obtain approval of their proposed course of study early in their academic program.*

1. High school diploma or equivalent.
2. Twenty-four semester hours of credit with grades of "C" or better in college level courses in the social sciences.

Much importance is attached to general background courses in the belief that they help to broaden the thinking and understanding of the student so that he will possess a wider range of ideas and interests and sounder judgment of social values than would otherwise be the case and, in consequence, will be able to render Government service of a higher level of value. For this reason, these requirements will not be waived.

With the approval of the Registrar of the Graduate School, credit may be given for not more than six hours of other courses which are considered to be of value in connection with work in public administration (such as English literature, composition, philosophy, mathematics, or natural sciences). Introductory courses in the following must be taken:



American or European Government or Political Science  
Economics

American or European History

Public Administration

3. Twenty-four semester hours of credit with grades of "C" or better in undergraduate and graduate courses in public administration, excluding all accounting courses except Federal Government Accounting. The 24 credit hours are to be distributed as follows:
  - a. A minimum of six credits from the Division of General Administration.
  - b. The remaining eighteen credits may be selected from the Divisions of Organization and Methods Analysis, Financial and Budgetary Administration, Personnel Administration, Legal Administration, Procurement and Property Management, or additional courses in general administration.
  - c. Upon prior approval by the Registrar, credit for courses outside the Department of Public Administration (including not more than two courses in office techniques and operations) may be applied when such courses are properly in line with the student's major interest.

### *Requirements—Graduate Study*

*Students seeking this statement should consult with the Registrar and obtain approval of their proposed course of study early in their academic program.*

1. Bachelor's degree. This requirement will be waived only in very exceptional cases when the student can offer educational accomplishments substantially equivalent to a Bachelor's degree and when he has demonstrated by appropriate examination the breadth of knowledge equivalent to such a degree in the social sciences.
2. Twenty-seven semester hours of credit with grades of "C" or better in advanced undergraduate and graduate courses in public administration, of which twelve hours of credit shall be for courses numbered 500 and above, and excluding all accounting courses except Federal Government Accounting. The 27 credit hours are to be distributed as follows:
  - a. A minimum of eight credits from courses in the Division of General Administration, in addition to *c* below.
  - b. Sixteen credits may be selected from the Divisions of Organization and Methods Analysis, Financial and Budgetary Administration, Personnel Administration, Legal Admin-

istration, Procurement and Property Management, or additional courses in general administration.

- c. Three hours of credit for the course, Readings and Papers in Public Administration.
- d. Upon prior approval by the Registrar, credit for courses outside the Department of Public Administration may be applied when such courses are properly in line with the student's major interest.

### BACKGROUND COURSES

#### COMMITTEE

IVAN ASAY (Chairman)

ROY BLOUGH

JOHN J. CORSON

These courses provide a general foundation in American government and the fundamentals of public administration. They give the student an understanding of the theory and structure of our government so that as a public servant he may better appreciate the master-servant relationship between citizens and government employees.

A student who plans to take work in any of the divisions of the department will find that the specialized courses have more meaning and usefulness if he has first completed these background courses or their equivalent.

### 6-341. American National Government

Fall, 2 credits. Repeated in Spring and Summer

NORMAN J. SMALL

History and origins of the national Government of the United States; the political process—parties and elections; the legislative process; the functions of the national Government and their administration; courts and judicial review of legislation. Students are advised to take this course before Introduction to Public Administration.

### 6-344. Introduction to Public Administration

Fall, 3 credits. Repeated in Spring and Summer

DAVID S. BROWN  
DON L. BOWEN

This course is designed to introduce the student to the elements of public administration. Attention will be devoted to the evolution of administrative organization; organizational types: staff, line, and auxiliary agencies and functions; controls of administration; the broadest aspects of personnel selection, classification, training, movement, and relations; budgeting and fiscal control; federal-state relations; administrative legislation and adjudication. The object of the course is to lay a broad foundation for more intensive courses in management. *Prerequisite:* High school graduation or equivalent, or one course in the Clerical-Administrative Procedures Group, Department of Office Techniques and Operations. Desirable to have had American National Government.

### 6-351. Political Parties

Fall, 3 credits

CHARLES W. SMITH, JR.

The nature of political parties; the background of party division; party organization; presidential campaigns; propaganda techniques used to gain votes;

## Jump—McKillop Memorial Lectures in Public Administration

IN recognition of the service of William A. Jump and I. Thomas McKillop to the Department of Agriculture and their contributions to the development of public administration in the United States, the Graduate School in 1952 established the William A. Jump-I. Thomas McKillop Memorial Lectures in Public Administration. These lectures will be given biennially beginning in 1952.

### WILLIAM ASHBY JUMP

William A. Jump, who passed away on January 22, 1949, had been Department Budget Officer since the creation of that position in 1922, and Director of Finance since 1934 when the Office of Budget and Finance was established. His entire career was devoted to public service in the United States Department of Agriculture. In 1947, the Department, in recognition of his outstanding contributions, presented him with a Distinguished Service Award.

Mr. Jump was an outstanding leader in and out of the Federal Government in the field of public administration. Perhaps more than any other man in his lifetime, he influenced the development of modern budgetary and management concepts and the application of these concepts to the formulation and administration of Federal programs. In 1939-40, he served as a member of a subcommittee of the President's Committee on Civil Service Improvement. He was one of a group which founded the American Society for Public Administration. After the war, he contributed to the organization of the Food and Agriculture Organization of the United Nations, and in 1947-48 was United States representative on the five-nation Subcommittee on Finance. He participated in the establishment of the United States Department of Agriculture Graduate School and taught in the School for many years, and was a guest lecturer on public administration in many of the leading colleges and universities in the country.

### I. THOMAS MCKILLOP

I. Thomas McKillop was killed at the age of 38 in an airplane accident on June 30, 1951. During his short span of years he was an educator, a private management consultant, and a public servant. Born in Scotland, he was educated in America. He joined the staff of the Rural Electrification Administration in 1947 as an Industrial Engineer and later was made Chief of the Management Division. In the Rural Electrification Administration his work was based on the principle that government is the servant of the people, and he exemplified the REA philosophy of helping rural people help themselves. Mr. McKillop brought to public administration the philosophy of scientific management, of which he had profound understanding, yet in the execution of his daily tasks he always considered the rights of individuals. His contribution to public administration was a rare combination of native ability, management proficiency and belief in human values.

Mr. McKillop was a leader in the Graduate School's public administration program and one of its most successful teachers.

### LECTURE COMMITTEE

W. A. MINOR, *Chairman*

DAVID BROWN

O. B. CONAWAY, JR.

JOHN H. THURSTON

MARTIN KRIESBERG

OLIVER F. RAMSEY

the prediction of election results; sectional interests in politics; political leaders, demagogues, city machines, rural politics. *Prerequisite:* A course in American government, or at least one year of college work.

### **6-400. Administrative Operations for Congressional Assistants**

Spring, 2 credits (alternate years)

EVA B. ADAMS

This course deals with the practical administrative problems encountered by secretaries and other staff assistants to U. S. Senators and Congressmen. Such matters as the following will be considered: organizing the office routines; handling veterans' affairs; relations with the executive departments; the practical workings of Congress and assistance with legislative matters; pressure groups; relations with constituents; political organization and campaigns.

### **6-515. The Legislative Process**

Fall, 2 credits

LEWIS J. LAPHAM

Information about the legislative process which will tend to facilitate effective cooperation between the personnel of the Legislative and Executive Branches. The functions of Congress; organization of Congress; consideration of bills in committees; consideration of bills on the floor; party leadership in Congress; the functions of the Executive regarding legislation; assistance by executive agencies in the legislative process; relation of non-governmental groups to legislation; legislative staff aids; congressional investigations of executive agencies as a control mechanism; correspondence, informational, and informal relations between Congress and executive agencies.

To give vitality and practical value to the subject, basic orientation lectures will be supplemented by seminar sessions, visiting experts, visual aids and planned laboratory techniques designed to provide active student participation in Congressional processes. *Prerequisite:* A course in American government, or experience in legislative-executive relationships.

**7-250. American History to 1865** (See p. 93)

**7-251. American History Since 1865** (See p. 93)

**7-465. The American Tradition** (See p. 90)

## **GENERAL ADMINISTRATION**

### **COMMITTEE**

IVAN ASAY (Chairman)

ROY BLOUGH

JOHN J. CORSON

This group of courses brings together the scientific management developments of private industry and those of public enterprise into a basic and comprehensive program of general administration.

### **6-450. Principles of Scientific Management**

Fall, 3 credits

IVAN ASAY

Common functional elements of management. Definition of objective; organization; planning; coordination of execution through schedules, budgets, reports, and measurement of progress. Types of motivation. Historic management types. Types of organization. Personal relations and community relations in the several management types. Origin, nature and development of scientific



management. Application of scientific management in enterprises outside of government. *Prerequisite:* Bachelor's degree; or a course in American government or public administration and a course in social science.

### 6-519. Work Standards and Work Measurement

Fall, 2 credits. Repeated in Spring

WILFRED S. WILLIAMS and ECKHARD BENNEWITZ

A study of the most advanced techniques of scientific management concerned with development of work standards and measurement of work loads and performance, and of their adaptability in public administration. Statistical and experimental methods of determining standards. Dangers to avoid in setting standards. Time study. Standards as a dynamic part of operations, and a tool in developing policies on personnel placement and training. Standards as aids in developing budgets, in planning operations, and in individual work planning. Importance of dependable standards, measurement and appraisal of performance to summary statements of progress for the use of higher administrative officials. *Prerequisite:* Practical working experience at Grade GS-7 or above, or permission of instructors.

### 6-540. The Application of Scientific Management in Public Enterprise

Spring, 3 credits

PHILIP C. WARD

The influence of underlying economic and social forces on organized conduct of public affairs. Major types of public agencies and basic differences between these types. Origin of purpose and policy in public enterprise. Comparison of public and private enterprise as to motivation, objectives, establishment and operation. Criteria of the quality of public administration. Application of scientific principles in the management of public enterprise, including case studies of representative organizations and operations. *Prerequisite:* Principles of Scientific Management or the equivalent.

### 6-545. Administrative Leadership

Spring, 3 credits

JOHN J. CORSON

A study of the role of the administrator in public administration at all levels from the division chief up. Analysis of the role, responsibilities and nature of the administrator; of his influence on the organization and the influence of the organization upon him. Consideration of authority and its use.

Consideration of the ways the administrator accomplishes his objectives including analysis of his responsibilities for planning, communication, the development of people, leadership and the maintenance of organizational equilibrium. Special attention is devoted to contrasts between public and private administration. *Prerequisite:* Principles of Scientific Management or equivalent in training or experience.

### 6-550. Internal Organization Patterns

Fall, 3 credits

PERRY R. TAYLOR

Organization of public agencies and development of procedures for getting work done. The character of management tools in government and in private industry from point of view of middle-management and supervisors. The relations of major subdivisions to top administration and to coordinate subdivisions. Problems of coordination in a decentralized organization geographically dispersed. Importance of clear definition of responsibilities and of vertical and horizontal relations. The essence of supervision and of appropriate techniques. Coordination of activities, policies and objectives of component parts of an organization as an essential part of supervision. Establishment of standards and



of procedures for measuring and appraising performance. *Prerequisite:* Principles of Scientific Management or equivalent in training or experience.

### 6-600. Readings and Papers in Public Administration

Fall, 3 credits. Repeated in Spring

JOHN H. THURSTON, Coordinator

Under the guidance of a senior administrative official, supervised readings with monthly conferences on specified topics of administration or individual research and a paper on some problem or phase of administration. Readings or problem to be investigated are determined in consultation with adviser. *Prerequisite:* Approval of the Registrar; completion of 12 hours of course work in public administration, including Introduction to Public Administration, with at least a B average. This requirement may be waived in the case of persons at Grade GS-9 or above who are engaged in administrative work.

### ORGANIZATION AND METHODS ANALYSIS

#### COMMITTEE

HAROLD A. STONE (Chairman)

IVAN ASAY  
N. ROBERT BEAR  
HARVEY E. BECKNELL  
GERMAN S. ELLSWORTH  
WILLIAM A. GILL

EDWARD W. HARDING  
DAVID LEVINE  
JOSEPH P. LOFTUS  
JOHNSTON E. LUTON  
JOHN D. YOUNG

These courses are offered to give students an opportunity for progressive study and advancement in the general field of organization and methods work.

The courses use to advantage, among other background data, the instructional and case materials developed by the Bureau of the Budget and by other Governmental agencies. A student progressing through these courses should develop a well balanced understanding of the principles, techniques, and administrative aspects of O&M work. The courses are designed for students with varying degrees of experience in this field.

Students interested in this area will find useful the scientific management courses under general administration.

### 6-405. Principles and Techniques of O & M Work

Year, 2 credits each semester

DAVID D. LEVINE and JOHN D. YOUNG

Deals with the principles and techniques employed in surveying and analyzing organization and methods problems and in formulating solutions to such problems. Emphasis on planning and conducting procedures surveys; methods and approaches in analyzing and planning organization structures including analysis of the impact of individual and group behavior on formal organization structures and authority; methods of dividing work (production planning) and controlling work flow (production control); relationship of the scientific method to O and M work; analysis of staff and line concepts and relationships including the problem of overcoming resistance to new methods and procedures. *Prerequisite:* Experience in O&M work.

**6-585. Establishing and Administering O & M Work**

Fall, 2 credits

HAROLD A. STONE and JOHNSTON E. LUTON

Deals with the problems of establishing and administering organization and methods work. Covers the way an agency gears itself to improve management to bring about efficiency and economy of operations. Includes responsibilities and authorities of an O&M unit; relationships within and without the bureau, department and the Government; scope of O&M work; control and management of survey projects; long and short term programs of work; selecting staff; gaining acceptance of recommendations. Emphasis is placed upon different sets of circumstances encountered in O&M work. Cases are presented both by students and by instructors. This course is designed for persons who wish to expand their knowledge of the administrative phases of O&M work. It is essential therefore that they have previous education or experience or both in the practical application of its techniques. *Prerequisite:* Completion of courses in the principles of O&M analysis and consent of instructor.

**4-420. Procedure or Directive Systems** (See p. 44)

**4-422. Systems for Reports and Forms Management**  
(See p. 45)

**6-519. Work Standards and Work Measurement** (See p. 62)

## FINANCIAL AND BUDGETARY ADMINISTRATION

## COMMITTEE

JOHN L. WELLS (Chairman)

CHARLES L. GRANT

FRANK H. SPENCER

DAVID H. SPANIER

CARL W. TILLER

Students desiring a knowledge of how the Government obtains, budgets and manages its money will find helpful several of the background courses and some of the courses in general administration as well as the specialized courses in this division. Those with limited experience in this field will wish to begin their study with Federal Budgetary Procedure, in the Division of Office Techniques and Operations, and the background courses before attempting the advanced courses in Budget Formulation and Execution.

**4-116. Federal Budgetary Procedure** (See p. 42)

**6-360. Hospital Business Administration I: Accounting, Statistics and Finance**

Schedule to be announced. 2 credits

DAVID H. SPANIER and SPECIALISTS

Principles of hospital fund accounting: general fund income, expense and balance sheet accounts; temporary and endowment fund accounts; plant fund accounts. Adjusting and closing entries; prepaid and deferred items; preparation of trial balances. Hospital patient and hospital service statistics. Hospital financial and statistical statements. Cash receipts and accounts receivable procedures. Cash disbursements and accounts payable procedures. Inventories. Credits and collections. Payroll and personnel procedures. Check lists of

equipment and supplies; depreciation; reserves. *Prerequisite:* Principles of Accounting or the equivalent in experience.

### **6-361. Hospital Business Administration II: Cost Analysis Methods and Budgeting**

Fall, 2 credits

DAVID H. SPANIER and SPECIALISTS

Principles of hospital cost analysis methods, rate structures and budgeting. Detailed cost analysis problems, organization of accounting department, principles of internal control and food cost accounting. *Prerequisite:* Hospital Business Administration I or its equivalent in experience.

### **6-525. Financial Organization and Procedures of the Federal Government**

Fall, 2 credits

CARL W. TILLER

A comprehensive summary presentation of Federal fiscal administration, presented primarily on a lecture basis, and including review of the roles of major participants: Treasury, GAO, Congressional Committees, Bureau of the Budget, and operating departments. Designed to provide an understanding of the financial organization and procedure of the Federal Government, including such subjects as the Government fund and account structure, and its revenue structure and administration. An orientation course for persons working in some part of the area of financial administration, such as budgeting or accounting, and for general or program administrators who wish an over-all picture of the financial structure of the Government.

### **6-635. Budgetary and Financial Administration: Budget Formulation**

Fall, 2 credits

RALPH S. ROBERTS, JOSEPH C. WHEELER and STAFF

First part of an advanced, two-semester program for experienced budget and general administrative personnel. Covers the broad phases of budgetary and financial administration in the Federal Government primarily from the standpoint of the operating department.

The course deals with the pre-appropriation phases of budgeting, including formulation, review, and congressional enactment of the budget. Topics discussed include: the role of budgeting in program formulation; the role of bureaus, departments, Bureau of the Budget, the President and Congress in budgeting; content of the budget and of departmental estimates and related budgetary materials; the investment and capital-outlay budgets; review and analysis of budget estimates; budget justification; legislative-administrative relationships in budgeting. *Prerequisite:* Bachelor's degree and an introductory course in public administration; or experience at a responsible level in budgetary, financial or general administration; or consent of instructor.

### **6-636. Budgetary and Financial Administration: Budget Execution**

Spring, 2 credits

RALPH S. ROBERTS, JOSEPH C. WHEELER and STAFF

This is the second part of an advanced two-semester course covering the broad phases of budgetary and financial administration in the Federal Government. Several officials from bureau and department budget offices and other budgetary and financial organizations lecture and lead discussions.

This semester deals with the execution of the budget after it is enacted by Congress and the relationships of administrative planning and control, accounting, auditing, and financial reporting to budget execution. *Prerequisite:* Bachelor's degree and an introductory course in public administration; or experience at a responsible level in budgetary, financial or general administration; or consent of instructor.

## PERSONNEL ADMINISTRATION

## COMMITTEE

H. DEAN COCHRAN (Chairman)

MILDRED C. BENTON  
 JAMES L. BUCKLEY  
 L. M. CORRELL  
 VIRGIL L. COUCH  
 C. O. HENDERSON

G. E. HILBERT  
 HAROLD LEICH  
 ARTHUR B. McLEAN  
 ROSS POLLOCK  
 JOSEPH E. WINSLOW

The student is urged to begin with the background courses in public administration before concentrating on the program in this division. Unless substantial experience can be substituted, the general course, Public Personnel Administration, should be taken before the specialized courses (such as Position Classification, Selection and Placement, etc.). Persons who are in positions classified at GS-5 or below and desire to prepare for personnel work should begin with Federal Personnel Procedure; they should not attempt to take the specialized courses until they have gained substantial experience in personnel work or have carefully laid a foundation by completing all basic, general courses.

**4-114. Federal Personnel Procedure** (See p. 41)

**4-214. Advanced Federal Personnel Procedure** (See p. 43)

**4-201. Supervision** (See p. 42)

**[6-305.] Accident Prevention as a Factor in Good Management** (1953-54 and alternate years)

Fall, 2 credits

Instructor to be announced

### 6-430. Public Personnel Administration

Fall, 2 credits. Repeated in Spring

VIRGIL L. COUCH

Designed for supervisors and administrators wishing to have general familiarity with personnel work, for those in junior personnel staff positions desiring a broad understanding of personnel administration, and for those desiring to enter the field who need a foundation for the more specialized courses in the personnel field. Personnel problems which arise when people are associated together in a work situation; basic personnel policies and practices necessary and useful in treating personnel problems; differences between responsibilities, with respect to personnel administration, of the supervisor and the personnel officer; the various phases of personnel work; study of merit system and forms of organization; civil service legislation at various governmental levels; relationships between the Civil Service Commission and operating agencies and personnel offices of latter; trends in public personnel administration and its relationship to overall management. *Prerequisite:* One of the following: Introduction to Public Administration; Course 108 or 114 in the Department of Office Techniques and Operations; Grades GS-4 or above in personnel work; 60 semester hours of college work.



### 6-435. Selection and Placement

Fall, 2 credits

Instructor to be announced

Survey of the historical development and current thinking and practices in recruitment, selection, and placement of employees, with special reference to the Federal civil service. Emphasis in lectures and discussion is directed toward understanding basic principles which underlie policies and methods in public employment, with only incidental attention to the development of skills in such specific techniques as interviewing, examination preparation and administration, and reemployment investigation. The course is intended for students who wish to understand the "why" of public selection and placement procedures, rather than for those primarily interested in how such procedures are carried out. *Prerequisite:* One of the following: Course 344 or 430 in Public Administration; Grade GS-4 or above in personnel work; 60 semester hours of college work.

### 6-437. Psychological Tests and Measurements

Spring, 2 credits

ALBERT MAPOU

Acquaints the student with different types of psychological tests, rating scales, interviews and other evaluation techniques and their uses in the fields of personnel administration, employee counseling, vocational guidance, and education. Useful to personnel workers, teachers, counselors, test examiners, and of general interest to the student of psychology. Topics covered: the theory of measurement; evaluation of measuring devices; use and interpretation of tests; types of aptitude, achievement and personality tests; the use of rating scales and standardized interviews. *Prerequisite:* A course in psychology and one in statistics; or experience in personnel or guidance work; or consent of the instructor.

### 6-444. Position Classification

Fall, 2 credits. Repeated in Spring and Summer

WILLIAM C. LAXTON and JOSEPH P. FINDLAY

Covers the fundamental concept of position classification and its uses; relation of classification to compensation and other phases of personnel management; analysis of Classification Act of 1949; identification, analysis and application to specific positions of factors determining class and grade levels; discussion of job evaluation techniques; and application of position classification in the Federal service including operating policies, practices and procedures. *Prerequisite:* One of the following: Courses 344 or 430 in Public Administration; Grade GS-4 or above in personnel work; 60 semester hours of college work.

### 6-448. Wage Administration

Spring, 2 credits

THOMAS T. TOWNSEND

Basic concepts of and organization for wage administration in the Federal Government; brief history of the laws, orders, regulations and decisions that affect wage rate setting and the administration of wage rates; wage policies and procedures of departments and agencies that are major employers of "blue collar" workers; impact of wage stabilization on administration of wage programs. Provision for participating in practical work assignments.

### 6-580. Classification and Pay Administration

Fall, 2 credits (every third year)

JAMES L. BUCKLEY and SPECIALISTS

Analyses and discussions of: policy development and execution in administering the Federal position classification and pay plans; roles of the Civil Service Commission, Bureau of the Budget, Congress and Congressional committees in the policy and in other phases of classification and pay administration; policy coordination between classification and pay administration and other phases of personnel management and general administration; strengths and



weaknesses of the present Federal classification system. *Prerequisite:* Knowledge of the technical principles of Federal classification and pay administration gained through formal study and through broad administrative experience in classification and pay administration at GS-11 or above.

**[6-582.] Personnel Division Management (1953-54 and alternate years)**

Fall, 2 credits

VIRGIL L. COUCH

**6-620. Administration of Training**

Fall, 2 credits

E. R. DRAHEIM

Designed to give special assistance in training administration to present or potential training officers and to administrators and supervisors who do not have the services of a training officer. Training as a tool of management; the administration of training; organizing to get training done; group dynamics—the use of group participation and judgment in planning for and getting training done; career development—the individual's part in his own development; the supervisor's job in developing employees; application of the laws of learning to in-service training; review and demonstration of the use of some of the methods for effective training; techniques and devices to get quick acceptance of ideas; training administrators and supervisors to select and use those methods, techniques and devices which are the best for given situations; methods of evaluating training programs and techniques.

**6-730. Training Problems—Seminar**

Spring, 2 credits

C. O. HENDERSON, FRANK BARLEY, and JOHN MOORE

A systematic study of some of the more basic problems of employee training in the public service, for the purpose of adding to the general understanding of how best to get training done. Open to training administrators and others who have the immediate responsibility for administering training programs. Specific problems discussed are determined by the members of the seminar.

Attendance at the seminar is by invitation. Interested persons may apply in writing to the Graduate School, stating appropriate training and experience. Participants selected register in the usual manner.

**LEGAL ADMINISTRATION**

**COMMITTEE**

ASHLEY SELLERS (Chairman)

THOMAS J. FLAVIN

RALPH F. KOEBEL

DAVID REICH

**6-320. Introduction to Administrative Law and Procedure**

Fall, 2 credits

EDWARD C. JOHNSON

A survey, for the general student, of the nature of administrative law, its subject matter, and methods of administration. The rule-making and adjudicative or determining procedures by federal and state regulatory agencies and the remedies against administrative action receive special consideration.

The increased complexity of modern society has meant that administrative tribunals have played an expanding role in the regulation of life and property. This course includes a study of the law which controls and the regulations which are made by governmental officers to implement that law. A survey of economic and social forces involved in regulatory action. Material used includes regulations, orders and decisions of federal, as well as state and municipal bodies, which acquaints students with current developments in administrative law and

procedure. Topics covered include: powers and duties of administrative authorities as they relate to the supervision of public, as well as private interests; means of enforcing decision; remedies against official action; legal qualifications for office; legal disqualification of officers; appointment, tenure, removal and compensation of officers; and related matters.

### 6-422. Business Law

Year, 2 credits each semester \*

EDWARD C. JOHNSON

Aspects of law essential to the conduct of modern business. Forms of business organization, bailments, property, sales, mortgages, negotiable instruments, contracts. *Prerequisite:* Principles of Accounting or equivalent, or consent of instructor.

\* This course is so arranged that students may attend both semesters or either semester. No subject matter, however, will be repeated.

### 6-425. Legal Aspects of Investigation—Criminal Evidence and Procedure

Spring, 2 credits

RALPH F. KOEBEL

Designed to provide investigative personnel and those desiring to prepare for such work, a background and insight into the legal aspects of their investigations: what types of evidence to seek; circumstances and conditions under which the evidence is to be obtained in order to have adequate probative value; and how to prepare such evidence for presentation in court or other procedure. Since all investigations are potential sources of prosecution, the requirements of criminal evidence and procedure often reach into the early stages of investigation. The instruction is designed to provide understandable information without overemphasis of technical aspects.

### 6-480. Copyright Law

Spring, 2 credits (alternate years)

LOUIS C. SMITH

Fundamentals of the law of copyright. Covers broadly the subject of legal protection afforded an author's writings, both textual and pictorial. Special emphasis on the history of copyright law in the United States; copyright relations with foreign countries; the procedure to secure copyright; the practices, rules and regulations of the United States Copyright Office; the rights of a user of an author's work; assigning and licensing copyrights; the infringement of copyright and its penalties; and a study of the problems which have arisen in the fields of motion pictures, radio and such new media as microfilm, television and ultrafax, as well as other subject matter of copyright including books, periodicals, works prepared for oral delivery, music and works of art.

Special consideration given to Government publications; the United States Government as copyright owner and as user of copyrighted works; and copyright problems which may directly affect the Government employee. *Prerequisite:* College degree or equivalent experience.

### [6-680.] Administrative Law (1953-54 and alternate years)

Spring, 2 credits

THOMAS J. FLAVIN

### 6-820. Problems of Federal Administrative Regulation

Spring, 2 credits (alternate years)

THOMAS J. FLAVIN

A seminar for advanced students using the case approach to consideration of the Administrative Procedure Act and its application to all areas of Federal regulation covered in that Act. *Prerequisite:* Extensive experience in regulatory work, with approval of instructor; or a degree in law, public utilities or public administration.

## PROCUREMENT AND PROPERTY MANAGEMENT

### COMMITTEE

JOHN B. HOLDEN (Chairman)

CLIFTON E. MACK  
FRANCIS R. MANGHAM  
CHARLES E. OFFUTT

JAMES SCAMMAHORN  
S. A. SNYDER  
FRANK H. SPENCER

RAY WARD

Courses in this area deal with how the Government purchases, manages and accounts for materials and supplies. Those interested in purchasing but with limited experience, will find it helpful to begin with the courses in Federal Purchasing Procedure and Federal Property Procedure before attempting the management courses.

Selected background courses in public administration together with courses in the Division of General Administration will provide a thorough training in administration in this area.

**4-113. Federal Property Procedure** (See p. 41)

**4-115. Federal Purchasing Procedure** (See p. 42)

**8-405. Principles of Specifications** (See p. 97)

### **6-455. Management of Governmental Supply**

Spring, 2 credits

JOHN B. HOLDEN

An advanced course covering the broad phases of handling and managing Government supply activities. Deals with supply policies, organization and management, finances, and laws governing supply. Topics: (1) organization and management of purchasing offices; (2) organization and management of warehouses; (3) property accounting, management and distribution of supplies and equipment; (4) management and training of purchasing and warehousing personnel; (5) procurement function efficiency determination and importance of project service objective and its relation to good Government purchasing and warehousing; (6) decisions of the Comptroller General and regulations affecting procurement; (7) nature of public contracts as compared with private contracts; (8) Federal Specifications and specification studies, including development and writing; (9) delivery requirements, inspection of supplies and liquidated damages; (10) market analysis and conditions which affect seasonal project work of Government bureaus; (11) laws which affect procurement contracts such as Walsh-Healey Act, Davis-Bacon Act, Eight-Hour Law; (12) functions of General Accounting Office, Federal Supply Service, Federal Prisons Industries and surplus disposal agencies in the supply scheme; (13) traffic problems and transportation studies on methods of shipment; (14) new developments in procedures affecting supply and dissemination of information to field supply units. *Prerequisite:* One of the following: Introduction to Public Administration; Federal Purchasing Procedure; Federal Property Procedure; Grade GS-4 or above in purchasing work; 60 semester hours of college work.

### **6-638. Government Defense Contracts**

Fall, 2 credits

JULIUS SILVERSTEIN

Laws and problems in defense contracting by the Federal Government, including such subjects as cost-plus contracts, contingent fees, priorities, subcontracting, escalation, financing, renegotiation, contract termination, and surplus property.

## ACCOUNTING

## COMMITTEE

JOHN C. COOPER (Chairman)

PAUL L. APPELMAN  
KARNEY A. BRASFIELD  
WARNER H. HORDLAWRENCE O. MANLEY  
CHARLES N. MASON  
ROBERT W. MAXWELL

HERSCHEL C. WALLING

The Graduate School offers accounting courses primarily as a means of training for the *public* service. The curriculum necessarily includes courses in general accounting because the basic principles are essential for Government accounting.

Students in classification grades below GS-5 will find it advantageous to begin with Federal Accounting Procedure or Federal Auditing Procedure. Preparation for higher-level accounting should begin with a year's study of Principles of Accounting, after the completion of which Federal Government Accounting may be taken. Intermediate Accounting, Cost Accounting, Auditing, Federal Tax Accounting, Advanced Accounting, and Analysis and Interpretation of Financial Statements provide advanced training for those who desire to progress further with a general accountancy program.

## CERTIFIED STATEMENT OF ACCOMPLISHMENT IN ACCOUNTING

The scope of accounting in the Federal service is wide. There are increasing demands for accountants having a knowledge of commercial as well as Government accounting. These demands have come as a result of the formation of many Government corporations and Federal regulatory agencies. Hence, the accounting program required for a Certified Statement of Accomplishment is broad enough to cover not only the regular appropriation accounting of the Federal Government, but also the accounting training needed for many other governmental activities. The program is comprehensive enough to meet both advanced training for the Government service, and also, if courses are carefully selected, the usual educational requirements for C.P.A. examinations. Students planning to take C.P.A. examinations should know the requirements of the state in which they plan to take the examination. In general, their study, in addition to accounting, should include the following: Principles of Economics, Corporation Finance, Investments, Mathematics of Finance, Business Law, Statistics, Business English, Principles of Marketing and Industrial Management.



*Requirements for Certified Statement*

1. High school diploma or equivalent.
2. Thirty-six semester hours of credit with grades of "C" or better in courses outlined below and distributed as follows:
  - a. All of the required courses.
  - b. No less than three semester hours credit from the Accounting Elective Courses.
  - c. No less than six semester hours credit from the Related Elective Courses.
  - d. The remaining six semester hours credit may be taken in either of the two elective groups.

## REQUIRED COURSES

<i>Courses</i>	<i>Number of Semesters</i>	<i>Semester Hours Credit</i>
Principles of Accounting .....	2	6
Intermediate Accounting .....	2	6
Cost Accounting .....	1	3
Auditing .....	2	4
Advanced Accounting .....	1	3

## ACCOUNTING ELECTIVE COURSES

Federal Government Accounting .....	1	3
Federal Tax Accounting .....	1	3
Analysis and Interpretation of Financial Statements .....	1	2
Mathematics of Accounting and Investment .....	1	3
Federal Accounting Procedure .....	1	3
Federal Auditing Procedure .....	1	2
or Advanced Federal Auditing Procedure .....	1	2
Budgetary and Financial Administration .....	2	4
Advanced Accounting Problems .....	2	6
Accounting Systems .....	1	2
Cost Accounting (Second Semester) .....	1	3

## RELATED ELECTIVE COURSES

Business Law .....	2	4
Principles of Economics .....	2	6
Principles of Statistical Analysis .....	2	6
Writing Procedures and Instructions .....	1	2
or Introduction to Official Writing .....	1	2

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**6-352<sup>a</sup>. Principles of Accounting—First Half**

Fall, 3 credits. Repeated in Spring and Summer

HERBERT G. MARSHALL  
WILLIAM H. ROWE  
STANCL M. SMITH

Elementary principles of accounting; discussion and problems. At the end of the semester students will be prepared to do the accounting necessary for a small business organization; i.e., keep a complete set of books, draw up statements at the end of the fiscal period, adjust the accounts for accruals, deferred items, depreciation, etc., and close the books. *Prerequisite:* High school graduation or equivalent.



**6-352<sup>b</sup>. Principles of Accounting—Second Half**

Spring, 3 credits. Repeated in Summer

HERBERT G. MARSHALL  
WILLIAM H. ROWE  
STANCIL M. SMITH

Continuation of first half covering more advanced principles of accounting; accounting for partnerships, corporations and manufacturing; depreciation policies and analysis of financial statements. *Prerequisite:* First half or equivalent.

**6-353<sup>a</sup>. Intermediate Accounting—First Half**

Fall, 3 credits

WARNER H. HORD

Advanced principles of manufacturing accounting, corporation accounting, and valuation as applied to current assets, fixed assets, intangibles, and liabilities, reserves and funds, installment sales. *Prerequisite:* A first year course in accounting.

**6-353<sup>b</sup>. Intermediate Accounting—Second Half**

Spring, 3 credits

WARNER H. HORD

Advanced principles of partnership accounting, including formation, operation, and dissolution; joint ventures; consignments; agencies and branches; application of funds. *Prerequisite:* First half or equivalent.

**6-354. Federal Government Accounting**

Fall, 3 credits. Repeated in Spring

CHARLES N. MASON

A review of the development of the accounting system for Federal funds and the present financial organization in which the accounting is performed with attention to the accounting responsibilities of each segment of the organization, including the Treasury Department and the General Accounting Office. Detailed study is given to the accounting problems of administrative agencies with special emphasis on the principles of controls, financial reporting problems, and recent developments in accounting in the Federal government. *Prerequisite:* Two years of Commercial Accounting, or Federal Accounting Procedure and one year of Principles of Accounting or the equivalent.

**6-360. Hospital Business Administration I: Accounting, Statistics and Finance**

(See p. 64)

**6-361. Hospital Business Administration II: Cost Analysis Methods and Budgeting**

(See p. 65)

**6-420. Advanced Accounting**

Fall, 3 credits

LAURENCE W. ACKER

Advanced principles of accounting, consolidated statements; foreign exchange; receivership; estates and trusts; budgets; public accounts. *Prerequisite:* Intermediate Accounting or equivalent.

**6-423. Mathematics of Accounting and Investment**

Spring, 3 credits

RALPH R. BOTTS

Calculation of compound interest, compound discount, sum of annuities, present value of annuities and perpetuities; accumulation of sinking funds and amortization of debts by installments. Calculation of bond yields, bond values, premiums and discounts. Computation of depreciation by sinking fund method and fixed percentage of book value method. Some study is given to life probabilities and the computation of premiums and reserves for the more common types of life insurance and annuities. Accounting applications and entries will be discussed for those students interested in the accounting aspects.

**6-510. Analysis and Interpretation of Financial Statements**

Spring, 2 credits

LAURENCE W. ACKER

Study of the flow or movement of funds as reflected in the financial statements. Use of ratios and other indices in the analysis and interpretation of financial position together with a consideration of trends and variations therein. Subject matter is developed through lectures and problems, supplemented with published financial statements. Each student prepares, under supervision of the instructor, an analysis of the current financial statements of some prominent corporation together with a comparison with the principal competitors in the field. *Prerequisite:* Intermediate Accounting.

**[6-642.] Cost Accounting (1953-54 and alternate years)**

Year, 3 credits each semester

ALFRED D'ALESSANDRO

**6-645. Federal Tax Accounting**

Fall, 3 credits

EUGENE C. MOYER

Federal taxation presented from the accounting viewpoint. Special attention given to income taxation. *Prerequisite:* Principles of Accounting; accounting experience desirable.

**6-646. Advanced Accounting Problems**

Year, 3 credits each semester (alternate years)

LAURENCE W. ACKER

This course is intended primarily to furnish a coverage of miscellaneous accounting problems for general review and partially to serve as C.P.A. examination review. It will include financial statements, municipal (fund) accounting, corporation accounting, partnership accounting; consolidation intercompany accounting; company accounting; accounting theory and other processes of accounting. In the second semester emphasis is placed on such subjects as accounting systems, and accounting for management purposes. Principal emphasis in the course will be placed on the working of problems at home and in class. Class discussion of these problems will be held, and loose leaf solutions will be distributed after the problems have been worked and discussed. Supplemental reading on the subject matter of the problems will be done by the student for his own benefit and at his own option. *Prerequisite:* Three years' accounting training. With instructor's permission, however, the course may be taken concurrently with third year accounting.

**[6-693.] Auditing (1953-54 and alternate years)**

Year, 2 credits each semester

JOHN C. COOPER

**6-694. Specialized Federal Accounting Systems**

Fall, 3 credits

EDWIN T. NOLAN and SPECIALISTS

Designed to acquaint the students with the basic principles and standards of systems design and with current developments and improvements in Federal accounting. The systems of a diversified group of Federal agencies are used as case studies. *Prerequisite:* Intermediate Accounting, Federal Government Accounting, and Cost Accounting, or the equivalent.

**6-695. Accounting Systems**

Spring, 2 credits (alternate years)

EDWIN T. NOLAN

Classification of accounts. Planning, designing and installation of accounting systems. Problems of management. Organization and correlation of accounting department with other departments. Illustrative systems, showing forms and procedures for specific types of business, including financial institutions, insurance, department store, public utilities and Government. *Prerequisite:* Intermediate Accounting.

# Social Sciences

## DEPARTMENTAL COMMITTEE

SHERMAN E. JOHNSON (Chairman)

BUSHROD W. ALLIN  
H. DUNCAN HALL  
PAUL E. NYSTROM  
HAROLD B. ROWE

CARL C. TAYLOR  
JAMES E. THIGPEN  
HARRY C. TRELOGAN (Vice-chairman)  
FREDERICK V. WAUGH

## PURPOSE AND SCOPE

Social science deals with people and the problems of human relationships, as contrasted with natural or physical science which deals with things and the problems arising out of physical relationships.

The problems of social organization and operation have become both absolutely and relatively more important with the increase in complexity of our industrial civilization. More and more, people are concerned with the organization of production, the distribution of goods and income, and with price policies. The individual as a consumer and investor, the businessman and the farmer as producers, find increasing need for a knowledge of economics and other social sciences. Large corporations are employing growing numbers of economists to help in the formulation of policy. Psychologists and social workers are finding a demand for their services in personnel work. And, the large number of Federal, state and local government agencies need more people adequately trained in social science.

Social science is divided into a number of closely allied fields including economics, sociology, political science, history, law, and psychology. A broad grasp of any one of these subjects implies at least some familiarity with the others, because of the many interrelationships among these studies. Yet the continued development of each social science has given rise to larger and still larger bodies of knowledge relating to it, until only through a considerable degree of specialization can the student hope to master any one part. Thus the great need is for people who have concentrated sufficiently on one phase of a social science, such as marketing in economics, to be thoroughly familiar with the details of fact and principles involved, yet who also have a broad underlying training in the allied fields.

The courses offered by the Graduate School are designed to aid in acquiring a general background in the social sciences, as well as the specialized training in particular fields which is necessary for successful work in many Government departments and in private business.

## SUGGESTIONS FOR PROGRAM OF STUDY

To meet the specific needs of students who have different educational and experience backgrounds and different immediate interests, the Graduate School has developed the following types of courses in the social sciences:

(1) *Courses of General Interest.* Several of the social science courses are designed to provide information of general interest to a large group of persons who do not expect to become specialists in a particular field, but who desire to obtain some background in a subject, as a basis for work in related fields, or purely as a personal interest. An employee in the personnel office of a Department of Agriculture branch responsible for market news and inspection services may wish to take a course in marketing in order to learn something about the subject matter dealt with by the personnel of the branch, or a course in psychology as an aid in dealing with the personal problems which are daily presented to employee counselors. The secretary to an economic research director may want a course in the principles of economics in order to become familiar with the terminology and general economic concepts to which her stenographic and filing duties relate. An almost unending array of job needs of this kind offers opportunities to the alert and ambitious employee to increase his capacity and usefulness to his employer. The many promotions within the Government service which can be traced directly to such training testify to the fact that study in the social sciences is profitable.

These courses of general interest are at the undergraduate level, such as Introductory Survey of Economics, Introduction to the Study of Human Relations, Introduction to Marketing, and General Psychology.

(2) *Undergraduate Basic Courses.* These courses are designed to provide a basic social science background for students who have not completed their undergraduate training or who have not had an opportunity to take the basic background work in economics and the other social sciences as a part of their qualification for Bachelor's degree work. These courses provide an opportunity for persons who enter the Government service in the lower grades to prepare themselves for professional advancement.

(3) *Graduate and Advanced Undergraduate Courses.* These courses offer work of graduate level but they are also open to undergraduates of advanced standing. Students who are registered for graduate credit will be expected to do more work in these courses than those who register for undergraduate credit.



(4) *Strictly Graduate Courses.* These courses are offered only for graduate students who have adequate background. They are usually conducted on a seminar basis and they require a great deal of participation and preparation of material by the students themselves.

Students working for graduate degrees should consult educational advisers in the institution where they expect to receive their degree. If they have not selected such an institution they should confer with advisers in the Graduate School who are teaching in the particular field in which they expect to concentrate. In general, students who wish to map out a course of study leading toward a graduate degree should plan their work to include:

- (1) Completion of basic undergraduate courses.
- (2) Advanced courses in social science fields related to the particular field of concentration. For example, a student majoring in economics should consider advanced courses in statistics, economic history, sociology or some other related field in order to broaden his educational background.
- (3) Advanced courses in the field of concentration. Students who expect to major in one of the social science fields should begin their graduate work by taking the basic graduate courses in that special field. For example, students who expect to major in any field of economics should plan to take at least six credits of work in advanced economic theory and six credits in monetary and cycle theories. With these courses as a foundation, the student can begin to specialize in courses in his particular field of concentration.

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## GENERAL ECONOMICS

### COMMITTEE

BUSHROD W. ALLIN (Chairman)

ROY J. BURROUGHS  
JAMES P. CAVIN

JOHN CORDON DAVIS  
HOWARD L. PARSONS

HOWARD S. PIQUET

Adequate foundation training in general economics is essential for satisfactory accomplishment in the study of any specialized branch of the subject. Hence, the primary objective in developing the following list of courses has been that of providing the basic work needed, by students who wish to carry out a systematic plan of study, at both undergraduate and graduate levels. In addition, a course on research methods is listed under this head. It is of general interest to students majoring in economics.

## 7-110. Introductory Survey of Economics

Fall, 2 credits. Repeated in Spring and Summer

ROY J. BURROUGHS and OTHERS

A mountain-top view of economic history, institutions, statistics, and analysis. Descent into the numerous valleys that invite detailed exploration is left to later courses. The course is a useful introduction for the student who wishes to take the subsequent year's course in *Principles of Economics*. It serves also to introduce the subject to those who will take no more formal economics but for whom life itself is the textbook.

## 7-201. Principles of Economics

Year, 3 credits each semester

ROY J. BURROUGHS and BUSHROD W. ALLIN

A basic course designed to equip the student with the simpler tools of economic analysis and with an understanding of the more important institutions of the economic system. Economic analysis is developed with respect to operations of the price system, behavior of individual consumers and business firms, and also the behavior of the total economy including the allocation of resources, the distribution of the total product to the factors of production and the conditions which favor high employment and a large national income. *Prerequisite:* A year of college work or its equivalent.

## [7-418.] Public Finance and Taxation (1953-54 and alternate years)

Spring, 2 credits

TYLER F. HAYGOOD

## 7-480. Money and Banking

Year, 2 credits each semester (alternate years)

RICHARD A. RADFORD

The principles of money. The value of money. Effects of changing price levels. Money, credit, and capital. Significance of the rate of interest. Fundamentals of monetary policy. Evolution of the banking system. The money-market. Principles of Central Banking. The Federal Reserve System. Quantitative and qualitative credit control. Banks and the creation of credit. Effects of the war on the banking system. Inflation and deflation. International monetary standards. International monetary relations. *Prerequisite:* Principles of Economics or equivalent.

## 7-548. Economic Analysis

Year, 3 credits first semester, 2 credits second semester

JAY ATKINSON and HOWARD L. PARSONS

The first semester deals intensively with economic theory as a tool of analysis for problems of consumption, production and the markets—with particular reference to the various degrees of competition. Analytical models such as the firm, the industry and the household form the core of the discussions.

The second semester deals with the theoretical tools of analysis for problems of the economy in the aggregate. Keynes' General Theory of Employment, Interest and Money is the basic document on which the semester's work rests. The various and numerous additions and criticisms that have followed Keynes' General Theory shape the remainder of the discussions.

The specific focus of the course is on the ways of thinking and factors considered by individuals and groups in the economy as they choose among alternative economic actions. As part of these considerations, special attention is given to understanding the effect of the particular institutions such as different forms of government, price control, production control, etc., on these choices. *Prerequisite:* A course in principles of economics.

**7-615. Interindustry Economics**

Fall, 2 credits

EZRA GLASER

The economic model as an analytical concept. Theoretical antecedents, simple Leontief scheme, more general models. Open and closed models. Choice and non-choice models. Basic tables. Inverse matrix of coefficients, its simple mathematical properties and economic meaning. Practical attempts to construct economic models with actual statistical data. Contribution of model building to economic theory and analysis. Assumptions behind the approach critically examined. Application to economic problems. Limitations: statistical and economic. Primarily a course for economists, with mathematics introduced as necessary. *Prerequisite:* An undergraduate degree with a major or equivalent in mathematics or economics; or a graduate course in economic theory.

**3-305. Mathematics for Economists**

(See p. 33)

**7-645. Mathematical Economics**

Year, 2 credits each semester (alternate years)

Instructor to be announced

A thorough study of the mathematical school of economists from the time of Cournot and Walras to the present, with primary emphasis upon modern interpretations, and on the relation between mathematical formulations and other contemporary economic schools. Specific attention is given to the formulation and statistical testing of quantitative economic theories, with reference both to supply and demand relationships and to production and distribution problems. Particular attention is directed to the dynamic as contrasted with static concepts.

**[7-705.] History of Economic Thought (1953-54 and alternate years)**

Fall, 3 credits

MAX J. WASSERMAN

**7-706. Modern Economic Thought**

Spring, 3 credits

BUSHROD W. ALLIN and JAMES P. CAVIN

A review of the ideas of the leading economic theorists of the past fifty years, including those of Marshall, Veblen, Commons, Mitchell and Keynes. *Prerequisite:* Principles of Economics or equivalent.

**[7-728.] International Financial and Trade Policies (1953-54 and alternate years)**

Fall, 2 credits

Instructor to be announced

**[7-712.] Research Methods in Social Sciences (1953-54 and alternate years)**

Spring, 2 credits

Instructor to be announced

**AGRICULTURAL ECONOMICS****COMMITTEE****BENNETT S. WHITE (Chairman)**

PHILIP F. AYLESWORTH

FLOYD E. DAVIS

HORACE R. JOSEPHSON

H. M. SOUTHWORTH

ROBERT M. WALSH

EVERETT C. WEITZELL

The great importance of enlarging and improving knowledge of the economics of agriculture is generally recognized. Constructive

accomplishment in this field requires thorough training in economics combined with a comprehensive grasp of its application to the special conditions of agriculture. Such a balanced combination can best be achieved by following a systematic course of study appropriate to the particular area of concentration desired. The courses offered by the Graduate School permit students to carry out such plans of study with concentration in the economics of agricultural production, agricultural finance, prices, and marketing. The electives and general interest courses provided also permit the adaptation of study plans to meet the special interests of individual students.

Shortage of well-trained marketing personnel, at both Federal and State levels, critically handicaps developing a well-rounded program under the Agricultural Research and Marketing Act. The greatest immediate need is for men with advanced training who can undertake independent work in new fields. The broad expansion of activities scheduled under the Act also will continue and intensify the need for adequately prepared college graduates. On both problems the Department of Agriculture is cooperating closely with land-grant institutions. Joint committees have analyzed and mapped out attack on these problems. As part of this plan the Graduate School has given special advanced training to Washington personnel engaged in marketing work, and regularly offers both introductory and advanced courses in this field.

#### CERTIFIED STATEMENT OF ACCOMPLISHMENT IN AGRICULTURAL ECONOMICS

The Graduate School offers a Certified Statement of Accomplishment to students who have completed 30 credits of graduate work in agricultural economics, including the basic graduate courses in economics. To qualify, it is necessary to follow the specific sequence of courses that are listed for three fields of concentration indicated below.

The Certified Statement of Accomplishment is not an advanced degree, but it constitutes evidence of completion of an organized course of study in the field of agricultural economics. It is a certification that the student has completed a program of study which prepares him for effective public service in agricultural economics work. The Graduate School plans to extend the granting of Certified Statements of Accomplishment to other social science fields as there is sufficient demand.



## COURSES LEADING TO CERTIFIED STATEMENT OF ACCOMPLISHMENT IN AGRICULTURAL ECONOMICS

*(With Concentration in Specified Fields of Application)*

### BASIC UNDERGRADUATE COURSES

Required foundation courses. Carry undergraduate credit only and may not be used to meet the credit hour requirement for the certified statement. Equivalent courses will be accepted by transcript from other institutions.

The number in parenthesis after course title indicates semester hour credits.

<i>Economics of Production</i>	<i>Agricultural Finance</i>	<i>Prices and Marketing</i>
Principles of Economics (6)	Principles of Economics (6)	Principles of Economics (6)
Principles of Statistical Analysis (6)	Principles of Statistical Analysis (6)	Principles of Statistical Analysis (6)
Economics of Farm Production (3)	Economics of Farm Production (3)	Economics of Farm Production (3)
Introduction to Marketing (3)	Introduction to Marketing (3)	Introduction to Marketing (3)

### REQUIRED BASIC GRADUATE COURSES

Economic Analysis (5)	Economic Analysis (5)	Economic Analysis (5)
Money and Banking (4)	Money and Banking (4)	Money and Banking (4)

### REQUIRED SPECIALIZED GRADUATE COURSES

Farm Management (2) or Land Economics (3) Agricultural Policies (2)	Agricultural Finance (3) Farm Management (2) or Land Economics (3)	Economics of Marketing (4)  Agricultural Policies (2) Marketing Seminar (2)
Economics of Production (3)	Agricultural Finance (3)	

### ELECTIVE GRADUATE COURSES

Select courses in consultation with Graduate School advisers to complete the 30 graduate credits required for certified statement of accomplishment.

**[7-203.] Introduction to Marketing** (1953-54 and alternate years)

Fall, 3 credits

BENNETT S. WHITE

**7-207. Economics of Farm Production**

Fall, 3 credits (alternate years)

KENNETH L. BACHMAN

Designed to develop the economic principles of production and to relate these principles to practical farm problems; including their application in the determination of the proper combination of production resources, the selection of enterprises and the explanation of variation in agricultural production in different areas. A brief survey of the application of such principles in achieving optimum production.

**7-409. Farm Management**

Spring, 2 credits (alternate years)

WYLIE D. GOODSSELL

An advanced course in farm organization and management which combines development of economic principles of farm production with practical application to the planning and operation of farms of different types, sizes, and locations. The practical and theoretical aspects of purchasing, organizing, operating, and managing farms are treated. Consideration is given also to economic adjustments needed in specific farming areas and for the nation. *Prerequisite:* Economics of Farm Production, or equivalent.

**7-410. Land Economics**

Fall, 3 credits (alternate years)

V. WEBSTER JOHNSON

A survey of economic principles governing utilization of major land types, including an appraisal of present land resources and future need for various types of land and land uses; traditional practices and customs that affect land use; private and public land ownership and tenancy relationships; problems of new settlement; land income under different conditions of ownership and management; and various state and local measures for the direction and control of land use and occupancy. *Prerequisite:* Principles of Economics and experience as approved by instructor.

**[7-411.] Agricultural Finance (1953-54 and alternate years)**

Fall, 3 credits

DONALD C. HORTON

**[7-412.] Risk and Insurance (1953-54 and alternate years)**

Spring, 3 credits

DONALD C. HORTON and RALPH R. BOTTS

**7-414. Economics of Marketing**

Year, 2 credits each semester (alternate years)

H. M. SOUTHWORTH and HARRY C. TRELOGAN

An advanced course in which economic aspects of marketing agricultural commodities are systematically analyzed, with main emphasis on applying modern economic concepts to the successive problem areas developed. The first semester considers marketing, including transportation, storage, processing, and distribution, as a process of production. It explores the use of resources in this production, the effects of market institutions and organizations upon the use of resources and the productive services performed, and the criteria of efficiency of this productive process and of public policy designed to improve it. The second semester considers the market as a mechanism for establishing prices. It explores the functions of market prices, the process of price-making, the effects of market organization and practices, and the relationships between margins and the costs of productive services in marketing, and the criteria of efficiency in price-making and of public measures that regulate or intervene in the price-making process. *Prerequisite:* Principles of Economics and Introduction to Marketing, or equivalent as approved by instructors.

**[7-416.] Agricultural Cooperation (1953-54 and alternate years)**

Spring, 3 credits

MARTIN A. ABRAHAMSEN, HAROLD HEDGES, and STAFF

**7-461. Transportation Rates and Rate Determination**

Fall, 2 credits

ABBEFORD S. DOLCH

The course is designed to give the basis for a general understanding of the use of traffic documents, commodity classifications, tariffs and traffic publications for the several forms of transportation, and a knowledge of rate principles and history of major rate adjustments. *Prerequisite:* Some general experience with rates and tariffs.

**7-462. Traffic Management**

Spring, 2 credits

JAMES F. PERRIN

Designed to acquaint transportation students with the principles and practices of traffic management from both Governmental and commercial points of view. Emphasis on functions of a traffic department, both industrial and Governmental, and on relations between carriers and traffic departments, with a considerable portion of the emphasis placed on transportation law. *Prerequisite:* Transportation Rates, or experience with rates and tariffs, or permission of instructor.

**7-468. Current Transportation Problems**

Fall, 3 credits

DONALD C. LEAVENS

Current policies and practical problems in transportation, including the theory and technique of regulation and economic, legislative and administrative factors requiring consideration in dealing with transportation problems. Historical background of the present transportation situation. Influence of transportation facilities, services, and costs on the extent and nature of economic development of production areas and on the location of commercial centers for processing and storage operations; agricultural and non-agricultural products and rate-making; current problems of rail, truck and water competition; regulated versus unregulated motor carriers; and the effect of recent rapid increases in transportation costs on sources of supply, market areas, and consumers. Primarily, a general course in economics of transportation, with some special attention to agriculture. *Prerequisite:* A course in principles of economics and a basic course in economic theory, agricultural economics, or marketing.

**7-485. Marketing Livestock and Livestock Products**

Spring, 2 credits

GERALD ENGELMAN

An advanced course in which the economic aspects of marketing livestock and livestock products are systematically examined and analyzed. Marketing methods, channels, agencies, and functions are surveyed and are evaluated on the basis of efficiency of resource use with respect to services performed. Marketing costs, grading, market news, consumption patterns, changing demands, and supply responses are also discussed. Particular emphasis is placed on the effectiveness of the pricing mechanism at the several stages of the marketing process in transmitting consumer preferences for various types of meat and other livestock products through the marketing structure back to the livestock producer.

**7-530. Methods of Price Analysis**

Year, 2 credits each semester (alternate years)

RICHARD J. FOOTE and ROBERT M. WALSH

A survey of the main price problems in agriculture and in marketing and consumption of farm products; a critical analysis of recent developments in economic theory and in statistical techniques and their use to measure the effects of various factors influencing prices; and a study of the accuracy and usefulness of price forecasts. Attention is given to Government price, production and marketing programs and to trade practices and market organization as they affect the prices of farm products at various stages in the marketing process. Emphasis is placed on developing proficiency in application of price analysis methods. *Prerequisite:* Principles of Economics, and a course in statistics which included correlation analysis.

**[7-716.] U. S. Agricultural Policies and Programs (1953-54 and alternate years)**

Fall, 2 credits

PHILLIP F. AYLESWORTH and OTHERS

**7-719. Resource Utilization Problems and Policies**

Spring, 2 credits (alternate years)

V. WEBSTER JOHNSON and HORACE R. JOSEPHSON

A seminar in conditions, problems, and public policies in the utilization and conservation of natural resources, with particular reference to current policies and programs. Discussions cover agriculture, grazing, forests, water resources, strategic minerals, and other important natural resources. Integrated topics include river basin development, utilization of tropical resources, population in relation to resources, and similar subjects. *Prerequisite:* Graduate work in related areas, or experience as approved by instructors.

**7-720. Economics of Production**

Spring, 3 credits (alternate years)

SHERMAN E. JOHNSON and ASSOCIATES

A seminar dealing with special problems in the broad field of economics of production. Students will be expected to prepare papers on problems of interest in their special fields. Different research workers and administrators participate in the discussion of current problems under the guidance and coordination of the instructor. *Prerequisite:* Background of graduate work and approval of instructor.

**[7-721.] Agricultural Finance (1953-54 and alternate years)**

Spring, 3 credits

NORMAN J. WALL and RUSSELL C. ENGBERG

**[7-722.] Marketing—Seminar (1953-54 and alternate years)**

Spring, 2 credits

HARRY C. TRELOGAN

**7-750. Farm Price Policy**

Fall, 2 credits (alternate years)

ORIS V. WELLS

Seminar for advanced students interested in agricultural programs and policies, especially in farm price and marketing programs and their relation to other farm programs. Special attention will be given to the current content of agricultural policy generally, to the development and importance of price and marketing programs, and to the analysis of some of the leading criticism of current price policies. Credit is awarded on the basis of class discussion and papers submitted on special subjects. *Prerequisite:* College major in agricultural or general economics; graduate work in farm prices or marketing; or comparable experience as approved by the instructor.

**COOPERATIVE EXTENSION EDUCATION****COMMITTEE**

MARY L. COLLINGS (Chairman)

ARTHUR L. DEERING  
D. BARTON DELOACH  
ERWIN C. ELTING  
CANNON C. HEARNE

FRED C. JANS  
JOSEPH L. MATTHEWS  
PAUL E. NYSTROM  
MARY A. ROKAHR

Cooperative extension education consists of the off-campus, non-resident teaching service of the land-grant institutions in cooperation with the USDA and the leadership of a county. It is the largest non-school educational program in the United States. The growing interest on the part of county agents, supervisors, specialists, and administrators in cooperative extension work as a profession has led the Graduate School to appoint a committee on Cooperative Extension Education. This committee has the responsibility for giving guidance to students toward a program best suited to the individual's needs, within the framework of the Graduate School. This program may well lead to an advanced degree depending upon the plans of the student and the cooperative arrangements available through the Graduate School.

The following courses will be given as the demand justifies:



**7-450. Principles and Techniques of Teaching**

Fall, 2 credits

GLADYS GALLUP and OTHERS

This course is designed primarily for experienced government workers. The principles, methods, and techniques of education will be applied to educational programs in government. The relative influence of teaching methods will be studied from the point of view of reaching and teaching more people.

**7-451. Extension Education for Foreign Students**

Schedule to be announced. 3 credits

FREDERICK P. FRUTCHEY

A foundation course designed to give foreign students a broad introduction to extension work, its basic philosophy, principles of teaching, organizational framework, and current developments. Includes analysis of economic, social, cultural, and psychological factors that influence the results of extension programs and the methods and procedures used by extension workers to reach farm people.

**7-535. Basic Evaluation, Research Methods and Techniques**

Fall, 2 credits

LAUREL K. SABROSKY and OTHERS

Evaluation, clarification of objectives, techniques that any government worker engaged in an educational program might use in measurement, sampling procedures, analysis, interpretation, presentation, and use of data. It is not the intention to make a "studies expert" of each student, but to give a broad concept of methods of systematically appraising work and programs.

**7-595. Four-H Club Organization and Procedures**

Spring, 2 credits

Staff—Divisions of Field Coordination and Field Studies and Training, Extension Service

Specially designed for county and other extension youth workers, this course stresses 4-H Club objectives and the principles and operational aspects of planning and conducting effective youth programs. It includes lectures, demonstrations, discussions, and field experience.

**7-596. Development of County Programs**

Spring, 2 credits

J. L. MATTHEWS and CANNON C. HEARNE

A systematic study of methods of developing voluntary county educational programs, including sources of essential basic information; the role of lay people and of supervisors, specialists, and county workers; use of planning committees; step-by-step procedures; coordinated county plans; and characteristics of good programs. Special reference will be made to Extension programs, but principles and procedures are applicable to all voluntary educational programs.

**7-620. Administration and Supervision**

Schedule to be announced. 2 credits

MEREDITH C. WILSON and OTHERS

Objectives, principles, methods, and techniques of administration and supervision applied to the Cooperative Extension Service. The course is designed for experienced extension workers.

**7-695. Problems in Cooperative Extension Education**

Schedule to be announced. Credits to be arranged

Staff—Division of Field Studies and Training, Extension Service

An opportunity will be offered to qualified, experienced extension workers who desire to undertake a study of a problem in cooperative extension education. The amount of credit, to be determined by a committee, will be based upon the nature of the problem, amount of work, and quality of the study.

## HUMAN RELATIONS

## COMMITTEE

CARL C. TAYLOR (Chairman)

GEORGE W. ALBEE

FORREST E. CLEMENTS

JOHN M. BREWSTER

MARGARET J. HAGOOD

T. WILSON LONGMORE

Courses in human relations are planned to meet the needs of four types of students: (1) those who wish a general rather than specialized knowledge of social problems and processes; (2) those who wish substantial first undergraduate courses in sociology, anthropology, and psychology; (3) those who wish specialized undergraduate and graduate courses in these same fields; and (4) mature persons who wish courses which use the knowledge of all social sciences in considering public issues and policy.

Introduction to the Study of Human Relations is designed to meet the needs of the first of these types of students. The American Tradition is representative of courses designed to meet the needs of the fourth class of students. Most of the other courses are standard college undergraduate and graduate courses in their respective fields.

Undergraduate students who have not had general orientation in the field of sociological sciences should enroll in Introduction to the Study of Human Relations so that, during the progress of the course, they may decide which of the specialized subject matter fields they care to pursue further. Most of the first courses in specialized fields of psychology, sociology, and anthropology are so placed as to give students who take this basic course the opportunity to pursue their specialized interests in a following semester.

Special attention is called to the courses offered in Population. They are designed to meet the needs of two groups: (1) those who wish a broad but nontechnical understanding of the significance of increasing population in relation to natural resources, occupational opportunities, social security, etc.; and (2) those who wish to develop a detailed understanding of the composition and dynamics of population and, among these, the ones who after taking the basic courses wish to take more advanced technical courses to prepare themselves for professional work in the field of population.

World Population Problems is designed to meet the first of these needs. The course has no prerequisite because it is assumed that it may be taken by either elementary or mature students in keeping with their desires to understand better the growing concern about population problems. All the other courses are designed to meet the needs of the second group. They form a sequence, as indicated by the prerequisites, and include both courses focused on

method and courses focused on content. The courses on population statistics, Courses 448, 449, and 700, are offered jointly by the Department of Social Sciences and the Department of Mathematics and Statistics.

### **7-050. Health and Medical Service Problems, Policies and Programs**

Fall, non-credit

MARGARET C. KLEM and HELEN JOHNSTON

Bi-weekly discussions cover subjects in which the group indicates a special interest and may include such topics as development of local public health services, health planning on a community and minimum regional basis, proposals on child health in connection with the Mid-Century White House Conference on Children and Youth, present status of work and possible future developments under the Hospital Survey and Construction Act, rural health planning, and fundamental concepts in various health and medical programs. The seminar may continue during the spring term. *Prerequisite:* Consent of the leaders. No fee is charged; registration, however, is required and is limited to professional personnel in one or more fields mentioned.

### **7-055. Point 4 and Contemporary National Cultures**

Fall and Spring (non-credit)

M. L. WILSON and CARL C. TAYLOR

A seminar designed to define different national cultures and to discuss how such knowledge is basic to effective bilateral and multilateral cooperation, with special attention to underdeveloped areas. The seminar is related to a lecture series (special lecture announcements will be issued) under the same title; visiting lecturers lead some discussions. Other sessions use the case method in analysis and discussion of current problems of program planning and administration, particularly in the technical assistance program.

Attendance at the seminar is by invitation and is limited to persons involved in program planning, policy making and administration of governmental and private programs. Registration is not required and no fees are charged.

### **7-060. Improving Group Work**

Fall, non-credit

THELMA A. DREIS and T. WILSON LONGMORE

A practical course in training in the skills involved in the roles of participants and leaders. Analysis of problem cases. Improved discussion methods, effective use of consultants and resource persons, and improvement in supervision and training. Class limited to 15. Persons in supervisory or other leadership positions will be given preference. *Prerequisite:* A course in human relations, social psychology, or public administration, or permission of instructor.

### **7-105. Introduction to the Study of Human Relations**

Fall, 2 credits. Repeated in Spring and Summer

T. WILSON LONGMORE

A study of the contributions of the various social sciences, but especially sociology, psychology and anthropology, to an understanding of human behavior. An integrative course for students who have not had an opportunity to study any of the sociological sciences. Designed to acquaint students with techniques and principles used in describing and analyzing human relations. Should not be taken by students academically prepared to do advanced work in this field.

### **7-210. General Psychology**

Fall, 3 credits. Repeated in Spring

GEORGE W. ALBEE

A study of the basic patterns of human behavior, instincts, habits, ideas and attitudes. The course begins with a thoroughgoing analysis of the human nervous system and concludes with an analysis of personality.

**7-215. General Sociology**

Spring, 3 credits

T. WILSON LONGMORE and ARTHUR F. RAPER

A basic and general study of social problems and processes with special emphasis upon such problems as population, race, poverty, crime, divorce, etc., and group processes such as organization, leadership, public opinion, etc.

**7-220. Introduction to Cultural Anthropology**

Spring, 3 credits

FORREST E. CLEMENTS

The origins of human culture, its historical development, language and culture, culture processes and principles of culture change. Stresses psychological factors in the acquisition and perpetuation of culture and analyzes human behavior as a resultant of innate and culturally acquired traits.

**7-301. World Population Problems**

Fall, 3 credits

DUDLEY KIRK

A general introduction, with emphasis on population problems and prospects in the United States. Training in use of United States and foreign census and vital statistics for the analysis of measurable human resources and social trends. Review of Malthusian and subsequent theories of population. Factors determining historic growth and distribution of the world's population. The current upsurge in population numbers. International and regional differences in the present balance of births and deaths. Economic, social, and resource factors in vital trends and prospects for growth. The impact of foreign aid programs on population trends in underdeveloped areas. Interpretation of population trends and prospects in the United States. Evaluation of population forecasts.

**[7-303.] Child and Adolescent Psychology (1953-54 and alternate years)**

Spring, 2 credits

LILY BRUNSCHWIG

**7-304. The Conditions of Personality Growth**

Fall, 2 credits (alternate years)

LILY BRUNSCHWIG

This course treats the principal factors influencing personality development: physiological bases, early experiences and cultural determinants. It considers both experimental and clinical contributions to the study of personality, and their application to practical problems of understanding and dealing with people.

**7-325. Managing Personal Finances**

Fall, 3 credits. Repeated in the Spring

HARALD C. LARSEN

The course has three main purposes: (1) to assist persons in planning the management of their finances to meet future needs; (2) to discuss principles which govern day by day financial decisions; (3) to acquaint students with the major financial instruments. Topics included are: building up of savings for such purposes as the education of children; plans for home ownership; fund for old age and retirement; renting versus owning a home; costs of home ownership; financing durable and other consumer goods; sources and costs of consumer credit and installment buying; life insurance and annuity contracts; protection versus savings; property liability and other insurance programs; planning and administration of estates; joint ownership; laws of intestacy; making a will; administration of estates as executor or administrator; proof of will, costs and fees; deeds, abstracts, mortgages, trusts, contracts, notes, stocks, bonds, debentures, and savings account; an introduction to the mathematical calculations needed in order to understand and use these instruments.



**7-332. Contemporary National Cultures**

Fall, 3 credits

DAVID RODNICK

Cultural backgrounds and behavior characteristics of different racial and national groups. Differences between these and American cultural and behavior patterns; phases in greatest conflict and likely to lead to misunderstanding. Use of cultural analysis in developing and administering international programs to the end that cultural conflicts can be recognized and identified. The course is adapted particularly to those concerned with developing and administering programs in foreign countries.

**7-400. Introduction to General Semantics**

Fall, 2 credits. Repeated in Spring

J. A. SAUNDERS

General Semantics may be defined as a study of human responses to language and other symbols; the relationships between words and things and between language and human behavior. It may be considered as a synthesis of science and the formulation of the general methods of science in such a way that they may be applied by the average individual to help him solve his every problem. The great majority of people who learn to apply the principles and methods of semantics find that these facilitate communication between individuals and between groups; eliminate the common errors in thinking which practically everyone makes at times and enables them to find more appropriate solutions to many of their problems (personal, professional, economic and social) in a shorter period of time and with a less expenditure of energy.

**7-433. Social Psychology**

Spring, 3 credits

CARL C. TAYLOR

A general course on the social aspects of personality, social interaction and collective behavior. It includes treatments of cultural conditioning of personality, personality measurement, communication, public opinion, propaganda, censorship, mobs, riots, and social movements. An individual project is required for the third credit. *Prerequisite:* A course in general psychology or equivalent.

**7-442. Personality Disorders**

Spring, 2 credits (alternate years)

ALBERT C. CORNSWEET

This course through lectures and case discussion will deal with personality variations as seen among normal people, stressing the significance of such variation in social and occupational adjustment, and with major types of abnormal personalities with emphasis on recognition of these deviations. Designed to help meet the needs of placement officers, counselors and others who through interviews or other media must recognize and deal with problems of emotional maladjustment. *Prerequisite:* A course in general psychology or equivalent.

**7-448. Population Statistics I: Basic Sources and Methods**

Fall, 3 credits

JACOB S. SIEGEL

Basic sources of population data in the United States. History of collection and quality of data. Basic methods of measuring and analyzing population size, geographic distribution, composition (age, sex, race) and population dynamics (natality, mortality, reproductivity, and migration). The decennial census. Basic demographic rates, including crude and refined rates. General methods (standardization, cohort analysis, interpolation, and graphics). Nature and use of life tables. Introduction to population estimates and forecasts. *Prerequisite:* An elementary course in statistics and one or more courses in the social sciences.

## 7-449. Population Statistics II: Intermediate Methods and Applications

Spring, 3 credits

MARGARET JARMAN HAGOOD

Statistics I, with more advanced techniques and specialized topics. Marriage and Divorce. Population Composition (marital status, educational status, economic characteristics, etc.). Family statistics. Advanced analysis of mortality, natality, reproductivity, and migration; measures based on life tables. Construction of life tables. Population estimates and projections, including specialized types (families, labor force, school enrollment). Analysis of population composition and dynamics in relation to other factors. Practical applications of methods in social and economic research, market research, and government planning. *Prerequisite:* Population Statistics I.

## [7-458.] Manpower and Labor Force Analysis (1953-54 and alternate years)

Spring, 3 credits

HAROLD WOOL

## 7-465. The American Tradition

Spring, 3 credits (alternate years)

JOHN M. BREWSTER

The development of Western Society has imparted to our American heritage at least three distinct types of life and corresponding forms of society. These types may be designated as the (1) aristocratic (dictatorial) view, (2) the middle-class view which, in America, finally developed into (3) the ideal of the self-made man. This course analyzes leading ideas in each of these views, giving particular attention to the conditions under which they arose, in a manner useful to those seeking better understanding of current problems, both domestic and foreign.

## 7-470. Applications in General Semantics

Year, 1 credit each semester \*

J. A. SAUNDERS

Designed for advanced students of General Semantics who desire more experience in applying the principles, techniques and devices of this new discipline to the solution of personal, professional, community and national problems. Members of the group will work on problems of their own choosing. Persons who select similar problems will be organized into sub-groups. Each individual or group, by the second meeting, will be expected to have presented an outline of its project to the director for his approval. Each individual or group will be expected to prepare at least one paper or "report" for discussion and evaluation by the class. Credit will be awarded on the basis of written reports on student projects suitable for general distribution. Audit students will participate in all activities of the group but need not submit reports for general distribution. *Prerequisite:* Completion of a course in General Semantics or equivalent, or permission of the instructor.

\* Students may attend both or either semesters.

## 7-482. Social Psychology of Communication

Fall, 2 credits

RICHARD S. FITZPATRICK

Interpretation of communication research studies in light of social psychological theory. Analysis of social psychological theory for insight into communication habits and impact. Study of the social psychology of perception, value, leisure time, and cultural differences as they affect communications by mass media. Learning theory and educational level as they affect communication behavior. Communication behavior in selected cultures. Social psychological bases for opinion formation and implications of opinion shifts and changes. Analysis of communication systems and data for research purposes. Constructing a theory of the social psychology of mass media. *Prerequisite:* Permission of instructor.

### 7-515. Group Processes in Agricultural and Rural Life Programs

Fall, 3 credits

CARL C. TAYLOR and T. WILSON LONGMORE

A study of various types of groups and group techniques which agricultural agencies utilize in carrying out their programs, neighbor groups, special interest groups, farmer committees, communities, townships, counties, various types of districts, and trade-centered rural areas. Analysis of the most effective group techniques for various types of groups, neighborhood, community, county and other meetings, discussion groups, workshops, conferences, audiences, etc. Analyses of leader-follower patterns, the roles of "functionary leaders" (agents), the role of "natural leaders" and "natural groups." To the extent that students are actual participants in agricultural programs the course will be conducted on a laboratory basis.

### 7-516. The Cultural Regions of the United States

Spring, 3 credits (alternate years)

CARL C. TAYLOR and ARTHUR F. RAPER

A study of the cultural regions of the United States, covering in detail the characteristics of the various regions and subregions and their interrelationships, including settlement patterns, social organizations and institutions, prevailing ideologies, mores and folkways, and dominant attitudes and opinions of the people who live in the rural areas of these cultural regions. *Prerequisite:* Two courses in the social sciences.

### 7-519. The American Farmers' Movement

Fall, 3 credits

CARL C. TAYLOR

The American Farmers' Movement. A study of American farmer upheavals and farmers' organizations from the Virginia-Maryland Tobacco Rebellion in the 1600's, to the present, including Shays' Rebellion, Jeffersonian Agrarianism, the Whisky Rebellion, early agricultural societies, the origin of the Grange, Farmers' Alliance, Greenback and Populist Parties, the American Society of Equity, the Non-Partisan League and the Farmers' Holiday Association. A detailed study of the present general farmers' organizations, the Grange, Farmers Union, Farm Bureau and others, how and why they were organized and how they function on local, state and national levels; the roles they play as economic and political pressure groups and in agricultural policy making. Comparison with farmers' organizations in other countries than the United States.

### [7-700.] Population Statistics III: Advanced Analytical Methods (1953-54 and alternate years)

MARGARET JARMAN HAGOOD

## HISTORY AND INTERNATIONAL RELATIONS

### COMMITTEE

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STANLEY K. HORNBECK  
NELSON T. JOHNSON  
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FRANCIS O. WILCOX

The perspective of history throws light on the question: "How have we come to where we are?" It cannot answer the question: "Where are we going from here?" But it is a guide to the possible routes.

Today it is essential that the citizen keep abreast of the wide range of the relations that exist between his country and other countries, between his people and other peoples, and the new conditions that govern those relations. Two world wars, having immediate causes in areas and among peoples remote from the ordinary occupations and tensions of American life, definitely and perhaps irretrievably have involved the United States in world affairs and relationships far beyond any experience in its past.

On the political side, world power has shown the tendency to become more or less polarized between two Great Powers, the United States and the Union of Soviet Socialist Republics. Profound changes, of which the results cannot be foreseen, are taking place in the political alignments of many nations. New regional consolidations are taking place. Cultural interests, economic relations, and political security are all being changed and reshaped. New technical advances are part of the driving forces making for change. New techniques in the handling of foreign relations are being developed. Beside old methods of bilateral negotiation for the settling of international problems, the machinery of the United Nations, designed to deal with a wide range of world conditions, has been established.

Security, spiritual, material, and political, was at the very foundation and purpose of government and human social organizations from the time nations took form up to our own times. But the conditions of security are changing. The notion of security as something bounded by physical frontiers is perhaps changing most of all. Ideas spread from mind to mind throughout the free world; and, at least on a one way basis, between the free and the closed world. The instruments of mass communication, like the radio, impose on governments new problems of public relations in the international sphere. One result has been the setting up of a new section of the State Department to deal with such matters as public opinion at home and abroad, broadcasting and films, and other aspects of cultural relations between peoples.

Public lectures and courses in this area are designed to give the student some opportunity for (1) acquainting himself with the new techniques and approaches to international relations; (2) acquiring insight into basic materials, causal factors and historical backgrounds that determine the main current trends in international relations; and (3) getting a deeper knowledge of some of the main world problems and their impact on particular regions and countries.



**7-250. American History to 1865**

Fall, 3 credits

WAYNE D. RASMUSSEN

A survey of the political, social, economic, and cultural forces, prior to 1865, which have contributed to the development of American civilization. Includes a summary of the colonial period; the political, economic, and diplomatic factors of the American Revolution; and the development of national life and institutions.

**7-251. American History since 1865**

Spring, 3 credits

WAYNE D. RASMUSSEN

A survey of the political, social, economic, and cultural forces which, since 1865, have contributed to the development of present-day American civilization. Includes the frontier movement and immigration; constitutional growth and changes in world relations; and economic change and development.

**7-324. International Relations**

Fall, 3 credits

REUBEN H. GROSS, JR.

An introductory course dealing with the nature and problems of the state in the modern world community; foundations of its power, influences upon its policy, and the character of its procedures. Diplomacy, nationalism, imperialism, international organization and other problems will be discussed.

**7-428. Current World Problems**

Summer, 2 credits

Instructor to be announced

Structure of state system; nationality; sovereignty as the maximum area of agreement. "We the peoples of the United Nations." Conditions of peace and causes of war (conflicts of will, interests and ideas; desires for things incompatible with peace; political, economic and ideological aggressions; insecurity, etc.). State and private struggle for power on the economic plane. Raw materials, population, agriculture and food. Diplomacy; military organization; ideological manipulations (political and psychological warfare by use of channels of communications, such as speech, press, radio, etc.); attempts to maintain peace and reasons for failure. Facilitating international cooperation, political, economic, cultural; and mitigating conflict by means of international institutions, public and private.

**7-452. Soviet Government and Political Institutions**

Fall, 2 credits

V. J. TERESHTENKO

An over-all survey of the organization and functioning of the Soviet government and political institutions. The constitution. The Supreme Soviet. Presidium of the Supreme Soviet. Council of Ministers. The planning system. The electoral system. Organization of the communist party. The nationalities policies of the Soviet government. Religion in the Soviet Union. Postwar development of political institutions.

**7-453. Soviet Asia**

Fall, 1 credit

V. J. TERESHTENKO

The territory of Soviet Asia in world history. Russian explorations in Asia, conquest of Siberia. "Siberia—Land of Exile." Revolution of 1917 and the Civil War in Asia. Foreign intervention. The position of Soviet Asia within the Soviet Union. Ethnic composition of population, cultural pattern. Natural resources. Economic development and industrialization under the four 5-Year Plans. Educational and cultural progress. Liberation of women. Moslem world under Soviet regime in Asia. Regional description of Kazakhstan, Turkmenian, Tajik, Uzbek, Kirgiz SSR; Birobidjan, Yakutiya, Far East. Impact of Soviet Asia on the world.

**7-465. The American Tradition**

(See p. 90)

**7-478. Twentieth Century Britain**

Fall, 3 credits

REUBEN H. GROSS, JR.

A history and an analysis of the effects on British culture and society of two World Wars and the Great Depression. The rise of the Labor Party and the decline of the Liberal Party, and the changes in the social structure, in social and political institutions, and in cultural expression which both caused and flowed from these developments. Britain's changing role in foreign and imperial affairs. A critical evaluation of the experiment in social democracy which started in 1945.

**7-519. The American Farmers' Movement**

(See p. 91)

**[7-525.] The Application of Psychoanalytic Theory and Methods to Problems of International Relations (1953-54 and alternate years)**

Year, 2 credits each semester

H. M. SPITZER

**7-650. The New International Organizations and the United States**

Spring, 3 credits

HOWARD B. CALDERWOOD

A survey of the new international organizations including not only those of the United Nations but also of the Atlantic System and Western Europe. A critical analysis of the proposed workings of the organizations, their machinery, and the ways in which they affect the United States. Illustrations from current problems. Discussions on major topics led by visiting specialists. *Prerequisite:* An undergraduate degree in one of the social sciences, or responsible experience in the international field, or consent of the instructor.

**7-655. The British Commonwealth and the United States**

Fall, 3 credits

H. DUNCAN HALL

A survey and analysis of the historical development, present nature and structure of the Commonwealth. The growth of the independent nation states within the Commonwealth. The older Commonwealth, and its new members (India, Pakistan and Ceylon); the growth of the Commonwealth in Asia, Africa and the Caribbean. The special quality of Commonwealth nationalism. Common and divergent interests, and the institutions and machinery of the Commonwealth for handling them and the relations of its members with other states. The bonds of past history, similar constitutional structure, family ties, common Crown, common citizenship. The bonds of corporate fellowship which link—through common symbols, allegiance, channels of communications, institutions and interests—the governing elements within each Member of the Commonwealth: Ministers of the Crown, members of the 50 Parliaments, judges, civil servants, members of the armed forces. The roles of the Commonwealth in world affairs: (1) relations with the United States and the place of the Commonwealth in its foreign policies and interests, (2) relations with the European and Atlantic systems, (3) the Commonwealth as a bridge with Asia, (4) its role in the United Nations. *Prerequisite:* Advanced undergraduate or graduate training in history or other social science or consent of instructor.

**7-660. American Foreign Relations, Policies and Practices**

Spring, 3 credits

NELSON TRUSLER JOHNSON

Fundamental principles as developed in the conduct of our foreign relations from the Declaration of Independence up to the close of the free immigration

period in 1925; significant subsequent developments through and following World War II, requiring us to accept and meet the responsibilities which go with our position among the nations.

United States Government organization for conducting its business with other governments. Factors which have played major roles in the development of foreign policy: commerce, international finance, shipping, fishing, agriculture, etc.; public opinion and the influence of media of mass communication; minority and pressure groups; etc. Implementation of foreign policy in peace and war, choice of people and machinery; informing other peoples about ourselves and how best to accomplish it. Need for effective coordination of our governmental machinery so as to identify and harmonize the needs and convictions of the whole American people in a united common action for the achievement of their ideals. Present methods of coordination. Other possible methods, including the Secretariat system. *Prerequisite:* Graduate study in the social sciences, or responsible administrative or supervisory experience, or approval of instructor.

### **7-665. Far Eastern International Relations**

Fall, 3 credits

PHILIP H. TAYLOR

Historical analysis of the nineteenth century meeting of East and West. Evaluation of the Far Eastern international relations of the last half-century, initiated with the highlights of geography and history, and based on an appreciation of the fundamental societal factors.

### **7-670. Contemporary Problems in International Affairs, Their Background and Historical Parallels**

Spring, 3 credits

H. M. SPITZER

The position of the United States in the world of today: the United States as an active material and spiritual force; the United States as an element in the policy of other nations. General factors which change the international scene: ideology, technology, population pressure, mass communication and mass participation. Colonial emancipation. Efforts to stabilize the political scene: ideology, technology, population pressure, mass communication and ment program—regional problems, cross currents in Europe, the Islamic world, Asiatic riddles. These situations will be discussed both topically (as they present themselves today) and genetically (how they came to assume their present form). Where similar situations have arisen in the past, parallels between present and past will be drawn to show the way in which and the success with which such situations have been dealt with. *Prerequisite:* Advanced undergraduate work or degree or approval of the instructor.

### **7-735. The Foreign Relations of the Soviet Union, 1917-1950**

Year, 2 credits each semester

FRITZ T. EPSTEIN

The Soviet Union in World Politics: trends of Soviet foreign policy between 1917 and 1933 (fall semester) and between 1933 and 1950 (spring semester). Soviet theory of foreign policy. Role of Komintern and Kominform. The relations of the Soviet Union to the principal Powers in Europe and Asia. The historical background for analyzing current events. The attitude of the Soviet Union toward the League of Nations and the United Nations, the Disarmament problem, the Little Entente, the Straits Question, the Baltic States, the Bessarabian Question, etc. Special emphasis on Soviet war-time and postwar diplomacy. *Prerequisite:* Advanced undergraduate or graduate study in the social sciences or permission of the instructor.

# Technology

## DEPARTMENTAL COMMITTEE

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R. G. HAINSWORTH

H. E. HILTS

HARRY F. MABBITT

E. J. UTZ

E. J. STOCKING

MARSHALL S. WRIGHT

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Various departments and agencies of the Federal Government are engaged in extensive programs designed to conserve the Nation's natural resources and to raise the standards of living of urban and rural populations. These programs include such projects as flood control, soil conservation, power development, mapping, rural electrification, industrial hygiene, housing, and a large number of related activities. All these projects involve in varying degrees engineering techniques and professional engineers, and include many functions requiring that this personnel have an intimate, working knowledge of techniques not provided in the standard engineering and related technological courses.

Basically, education in engineering schools is limited by necessity and tradition to a period of four or five years. This short period of training provides sufficient time to assimilate and master only a minimum of the basic sciences. There is little time available for courses which will give the technical student an understanding of the social and economic problems of the world about him. As a result, he fails often to appreciate the impact upon society of the advances of his profession. Moreover, technological techniques and practices are never static and developments in the sciences and in engineering require enlarging and constant reorienting of the engineer's technical background.

Mindful of the limitations of engineering education, of the engineer's place in modern society, and of the need for providing opportunity for additional study, the Graduate School, working with representatives of the various Government departments and agencies and of the local chapters of engineering societies, offers courses designed to add to the technical, administrative and professional background of engineers in the service of the Federal Government. Many courses offered also give an intimate working knowledge of the latest techniques that colleges and technical institutes often cannot provide.

The Department of Technology offers a number of courses in those skills, basic to engineering operations, which will be of assistance to the engineer, the applied scientist, and the non-engineer



desiring to broaden his background, to increase his efficiency, and to develop his professional capacity.

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## ENGINEERING

### COMMITTEE

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J. H. GEHRING

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FERDINAND KAUFHOLZ

W. D. POTTER

HARRY SAWCHUCK

J. P. SCHAEZNER

F. F. SNYDER

E. J. UTZ

JOHN A. WEBER

### 8-110. Principles of Electricity

Spring, 2 credits

DAVID ASKEGAARD

Principles of electricity, emphasizing alternating currents. Covers basic units such as voltage, current and power and their measurement, resistance, voltage regulation, line loss, power factor, three phase systems, etc. The function of equipment used on rural electric distribution systems such as generators, substations, transformers, lightning arrestors, fuses, oil circuit reclosers, etc., will be emphasized.

### 8-115. Practical Electronics

Fall, 2 credits

MILTON SANDERS

Basic characteristics of resistance, capacitance, and inductance taken singly and in combination; elementary circuit analysis, particularly as it pertains to series and parallel resonance; active circuit element descriptions including diodes, triodes, and pentodes; the processes of amplification, modulation, and detection; practical circuits in detail, such as voltmeters, oscillators, oscilloscopes, radio and television sets. The course stresses how electronic circuits work and is substantially non-mathematical using only algebraic concepts and a few simple complex notations. *Prerequisite:* General knowledge of physics and electricity.

### 8-402. Principles and Practice of Refrigeration

Fall, 2 credits (alternate years)

HARRY L. GARVER

Includes a study of: types of mechanical equipment, power, controls, evaporators, condensers, insulation and heat transfer, characteristics of refrigerants and eutectic solutions; refrigeration requirements for different foods; management of storages; and refrigerated transportation. *Prerequisite:* Physics, algebra, trigonometry, and analytic geometry.

### 8-405. Principles of Specifications

Fall, 2 credits

BENJAMIN ROSENZWEIG

A basic course in the principles underlying the government specifications systems. A brief survey will be made of procurement documents and the purposes they serve. The organization of specifications for form, clarity, and effectiveness will be demonstrated. The evolution and ramifications of specifications will be considered with regard to research and development; legal and contractual relations; proprietary items; and government inspection. The division of specifications into performance and formulation types will be reviewed. The problems of standardization and industry coordination will be discussed. *Prerequisite:* Knowledge of procurement, inspection, research and development processes, or specification writing.

**8-510. Analysis of Statically Indeterminate Structures**

Year, 2 credits each semester

ALFRED W. FISCHER

The first semester covers the review of the fundamental slope deflection equations and the moment distribution method. Subjects will include: rectangular frames; complex three column bent and Vierendeel truss with parallel top and bottom chords by the superposition method; general equation of flexural stress; an asymmetrical section unsymmetrically loaded; miscellaneous problems; review.

The second semester covers the column analogy method and the fundamentals of least work. Subjects will include: simple bents; unsymmetrical arch; fixed end moments; stiffness factor, carry over factors, and fixed end moments for an unsymmetrical curved member with varying moment of inertia; secondary stresses; miscellaneous problems; review. *Prerequisite:* Degree in civil engineering or equivalent.

**5-535. Fluid Mechanics**

(See p. 54)

**8-552. Recent Developments in Materials Engineering**

Spring, 2 credits (alternate years)

DANIEL KLATZKO, WILEY C. SMITH, and COMMODITY EXPERTS

Designed to acquaint engineers, technologists and others engaged in any phase of materials engineering, such as purchasing, supply, standards, and specifications, with recent developments in plant production of basic materials. Prominent specialists from production departments of some of the leading industrial corporations will participate as guest lecturers. Short films will be used to portray pictorially the discussion. Among the subjects covered will be aluminum and aluminum products, steel, lumber, concrete, petroleum products, detergents, plastics, ceramics, insulating and roofing materials, paints, rubber, leather, and textiles. *Prerequisite:* College degree or equivalent, or consent of instructors.

**[8-554.] Protecting Engineering and Scientific Developments Through Patents (1953-54 and alternate years)**

Spring, 2 credits

ALBERT J. KRAMER

**[8-560.] Fundamentals of Telephony I (1953-54 and alternate years)**

Fall, 2 credits

ROBERT S. NEIKIRK

**8-561. Fundamentals of Telephony II**

Fall, 2 credits (alternate years)

ROBERT S. NEIKIRK

Principles of manual and dial central office operation, repeater, carrier, composite and radio equipment. Tall transmission.

**8-570. Regional Planning**

Fall, 3 credits

SIDNEY E. DOYLE

Discussion of the objectives and problems involved in regional planning, including physical, population, and economic factors. Topics include techniques and procedures of planning, capital improvement, fiscal and administrative problems, civil defense, the role of government agencies, and the work of outstanding regional planning commissions. *Prerequisite:* Two years of college work including courses in civil engineering, agriculture, land economics, land planning, public health or similar fields.

## 8-702. Electric Utility Engineering

Year, 2 credits each semester

J. J. A. JESSEL and ALMON D. THOMAS

Fundamentals of electric utility engineering and their practical application to the generation, transmission and distribution of electric energy by the electric power industry. Designed to give engineers a broader understanding of the basic functions of operation electric utilities and of the basic engineering principles applied thereto. Subjects covered include: a general description of production, transmission, and distribution facilities of an electric utility, including each major unit of property and an explanation of its functions; design and operation of electric generating stations, transmission lines and substations, and distribution substations, feeders, transformers and service drops; practices followed by electric utilities in serving different classes of customers. *Prerequisite:* Degree in engineering or equivalent experience.

## SURVEYING AND MAPPING

### COMMITTEE

MARSHALL S. WRIGHT (Chairman)

WALTER DIX

GEORGE H. EVERETT

W. S. HIGGINSON

J. E. KING

GUNNAR LEIFSON

ALBERT L. NOWICKI

ROBERT H. RANDALL, JR.

HOWARD S. RAPPELEYE

LANSING G. SIMMONS

G. C. TEWINKEL

H. W. WHITLOCK

ARCHER M. WILSON

Maps have played an important part in human progress. Today, as never before, they furnish the basis for both military and non-military activities throughout the world. Greater use of maps has brought increasing demand for persons qualified in each of the technical phases of map production and reproduction.

The purpose of the curriculum in surveying and mapping is to offer basic training for those persons who are engaged in the technical and supervisory aspects of map making. The curriculum is intended to give the student a broad knowledge and basic understanding of each of the separate phases of the science; to enable him to understand better the problems, possibilities, and limitations of each of the phases. He can then better plan his own activities toward the economical production of accurate maps. A large part of the curriculum is devoted to geodesy, a subject considered to be of increasing importance in view of modern rapid means of world-wide travel, the consequent need for world-wide charts, and the development of new methods in surveying.

At least two years' work toward a degree of Bachelor of Science in Civil Engineering is considered as being the logical background for the curriculum in surveying and mapping, although one who has completed the sophomore year in engineering normally would have fulfilled the usual prerequisites. Many other potential students will also find that they may have already fulfilled all or nearly all the prerequisite studies. It should be emphasized that Calculus

and College Physics are desirable prerequisites for advanced courses. Persons who are planning a career in this field are urged to arrange their schedules so as to include these courses at the earliest opportunity.

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### *Surveying*

#### [8-135.] **Elementary Surveying** (1953-54 and every third year)

Fall, 3 credits

ERNEST J. PARKIN

#### [8-204.] **Ground Methods of Topographic Surveying** (1953-54 and every third year)

Spring, 3 credits

ERNEST J. PARKIN

#### [8-215.] **Route Surveying** (1954-55 and every third year)

Fall, 3 credits

ERNEST J. PARKIN

#### [8-217.] **Astronomy for Engineers** (1954-55 and every third year)

Spring, 3 credits

ERNEST J. PARKIN

### **8-218. Geodetic Surveying**

Fall, 3 credits (every third year)

ERNEST J. PARKIN

Theory and practice of first- and second-order triangulation, traverse, leveling; use of base-line equipment, repeating and direction theodolites, geodetic leveling equipment; field computations necessary to insure accuracy of observations. *Prerequisite:* Elementary Surveying or permission of instructor.

### **8-219. Computation and Adjustment of Geodetic Observations**

Spring, 3 credits (every third year)

ERNEST J. PARKIN

The office procedures in final computation and adjustment of field observations introduced in Course 218; least square approach to the adjustment of networks of traverse and leveling and simple triangulation figures. *Prerequisite:* Course 218 or equivalent or permission of instructor.

### *Photogrammetry*

#### **8-120. Introduction to Photogrammetry**

Fall, 2 credits

RANDALL D. ESTEN

Lectures and demonstrations in non-technical terms cover: the history and development of photogrammetric engineering; the importance of optics; basic principles of photography; types of aerial photography, aerial cameras, accessory equipment, and photographic aircraft; requirements of coverage, flight lines, tilt, and scale; photo interpretation and stereoscopes; requirements of horizontal and vertical control; radial plot and stereoscopic plotting instruments. Designed for persons who use aerial photographs in military planning and operations, highway development, agricultural land use and conservation, mineral and petroleum exploration, and in other engineering and industrial operations.



**8-208. Aerial Photographic Interpretation**

Fall, 3 credits

ETHAN D. CHURCHILL

Principles, techniques and applications of aerial photographic interpretation; history, concepts, types of aerial photographs, principles, techniques, and applications. Study, and use in various fields, of aerial photographs as a source of detailed natural and cultural information. *Prerequisite:* A general background in one of the following fields: surveying and mapping, cartography, geography, geology, forestry, agriculture, architecture, or allied engineering fields.

**8-212. Photogrammetry I**

Fall, 2 credits

W. S. HIGGINSON

Basic optics; basic geometric characteristics of aerial photographs; flight planning; simple tilt determinations, tilt problems, and tilt displacements. *Prerequisite:* College plane trigonometry.

**8-213. Photogrammetry II**

Spring, 2 credits

W. S. HIGGINSON

Radial line plotting methods, mosaics, determination of elevations from photographs, photo-interpretation, basic photography and laboratory practices; photographic materials; aerial cameras; camera mounts. *Prerequisite:* College plane trigonometry.

**[8-370.] Photogrammetry III (1953-54 and alternate years)**

Fall, 2 credits

G. C. TEWINKEL and BERNARD J. COLNER

**[8-371.] Photogrammetry IV (1953-54 and alternate years)**

Spring, 2 credits

G. C. TEWINKEL and BERNARD J. COLNER

**[8-408.] Advanced Aerial Photographic Interpretation  
(1953-54 and alternate years)**

Spring, 3 credits

ETHAN D. CHURCHILL

*Cartography***8-125. Introduction to Cartography**

Spring, 2 credits

EDWIN H. SERVESON

The purpose of this course is to introduce the student to the broad field of cartography. This includes general instruction in the history of maps; the shape of the earth; the fundamental concepts of the most common projections; the basic principles of surveying, topography, hydrography, photogrammetry, oceanography and sketch mapping; the classification, evaluation, compilation, construction and revision of maps and charts; and the methods and techniques of reproduction.

**8-222. Cartography I—Technical Elements**

Fall, 2 credits

GEORGE H. EVERETT

The geographic coordinate system and the basis for its dimensions; the use of the system in expressing relative location; determination of relative location by plane surveying; the interpretation of distance and direction in various types of maps; relating plane surveys to the spheroidal surface; geographic position computation; distance and azimuth computation; the substitution of a plane coordinate system for expressing relative location; use of lines of position; use of charts for position determination. *Prerequisite:* College plane trigonometry.

**8-223. Cartography II—Map Projections and Grid Systems**

Spring, 2 credits

EDWARD W. FONFARA

Includes: basic principles with practical applications; computations; use of tables; layout; definitions; classifications; and characteristics. Identification of such standard projections as the polyconic, mercator, transverse mercator, Lambert conformal, gnomonic, and stereographic; and coordinate systems including rectangular, broad-area and true military grid.

This subject is presented from the practical viewpoint without the complex variable theory applications. *Prerequisite:* College plane trigonometry.

**[8-224.] Cartography III—Large Scale Maps (1953-54 and alternate years)**

Fall, 2 credits

CYRUS FINLEY and JACOB SKOP

**[8-225.] Cartography IV—Small Scale Maps (1953-54 and alternate years)**

Spring, 2 credits

MARCUS A. ROSENBAUM

**8-240. Methods of Map Reproduction**

Spring, 2 credits

M. S. A. DELANEY and SPECIALISTS

Designed for persons engaged in the various phases of surveying and mapping. Covers modern media used in the preparation of the original and the original map copy itself for reproduction; the requirements of a good map/chart original; the advantages and disadvantages of photolithography, letter press, and gravure, including ozalid and photo-gelatin; color separation originals, negatives, and printing plates; combining half tones with the contour system. Provides the student with a broad working knowledge of the many steps involved in duplicating the map/chart original in black and white and multicolor work. Economy and precision in map-making is predicated on a knowledge of the process selected for reproduction.

**8-430. Theory of Map Projections**

Fall, 2 credits (alternate years)

JOHN A. O'KEEFE

Clarification, choice and properties of map projections; the application of the theory of map projections for determining the basic relations that will produce a projection of desired properties; technique of computing a special projection table; technique of constructing projections; great circles and rhumb lines; the mercator, gnomonic, polyconic, Lambert conformal, stereographic and other projections in common use; military, domestic and foreign grid systems. *Prerequisite:* Calculus.

**[8-440.] Theory of Geodesy (1953-54 and alternate years)**

Year, 3 credits each semester

ALFRED D. SOLLINS

**FINE ARTS AND ARCHITECTURE***Fine Arts***8-320. Water Color Painting**

Fall, 2 credits. Repeated in Spring

ROWLAND LYON

Theory and practice; painting from landscape and still life.

**8-321. Pencil Sketching—Life Drawing**

Fall, 2 credits. Repeated in Spring

DUANE A. McKENNA

A progressive course of study and practice designed to give the student a thorough working knowledge of the human figure. Emphasis on personal observation and experience so the student may express a full understanding of the essential properties of motion, structure, and form. Drawing from the model and outdoor sketching included. Open to both beginners and advanced students.

**8-60. Pencil Sketching and Water Color Painting**

Summer, non-credit

ROWLAND LYON

An informal class in theory and practice. Student may use either or both media. Class meets out-of-doors whenever possible.

**8-323. Portrait Painting in Oil**

Fall, 2 credits. Repeated in Spring

PIETRO LAZZARI

To enjoy this course the student need not have experience as an artist but must have the desire to achieve proficiency in portraiture.

Professional methods of painting oil portraits incorporating the basic techniques of the old masters and the spirit of modern art. Course includes, sketching, line composition and light arrangement; color, theory and technique of painting in oil. All work done from life.

**8-333. Survey of Art**

Fall, 2 credits

CHARLES M. RICHARDS

The course is designed to establish the basic values which underlie artistic achievement and to develop an appreciation of these values before the objects themselves. From age to age these basic values—the aesthetic values—remain the same. The lectures will attempt to relate the major epochs to one another so as to indicate the continuity of art history and at the same time contrast the variant forces and ideas which produced such differing styles and expressions.

**8-334. Modern Painting**

Spring, 2 credits

CHARLES M. RICHARDS

This course begins with a study of the art of the outstanding masters of the 17th Century and of the general current of painting in that century, with emphasis on the development of painting through the National Schools and styles up to the present moment. The main concern will be to arrive at an understanding and appreciation of impressionism and post-impressionism.

*Architecture and Drafting***8-305. Elements of Statistical Drafting**

Year, 2 credits each semester

NELSON P. GUIDRY

A practical course in drafting involving actual preparation of statistical maps and charts in class. Explanations of short cut methods of lettering technique and arrangement of component parts of illustrations. Complete illustrations will be prepared in ink ready for publication. The reduction, reproduction, and color application to statistical maps and charts will be explained. Students supply their own drafting tools.

**8-316. Landscape Design—Small Property**

Fall, 2 credits

JOSEPH C. GARDNER

The purpose of this course is to encourage and direct the creative impulse of the person interested in the landscape development of the small property, thus creating more interest and pleasure in the home. The course will include an

outline of the basic principles of land planning and their application to the design of the small property, with discussion of the principles of composition in relation to the selection and use of plants and other materials. The practical application of landscape design principles to specific problems. A discussion of the physical aspects of landscape development including construction methods, horticultural standards and maintenance requirements. Each member of the class will be required to submit a statement concerning his program for the plan and development of his property or property of his selection.

### **8-324. Basic Mechanical Drawing I**

Fall, 2 credits

LEO G. D. WIEMER

The use of drawing instruments. Lettering and dimensioning. Problems in conventional presentation of objects by means of lines, including geometrical problems, orthographic projection and auxiliary projection. One hour lecture and three hours drafting room work each week.

### **8-325. Basic Mechanical Drawing II**

Spring, 2 credits

LEO G. D. WIEMER

Advanced instruction in the elements taught in Basic Mechanical Drawing I. Developments and intersections. One hour lecture and three hours drafting room work each week. *Prerequisite:* Basic Mechanical Drawing I or equivalent.

### **8-340. Architectural Drafting I**

Fall, 2 credits

LEO G. D. WIEMER

Frame house construction. Study of wood framing and related building materials; arrangement of rooms and furniture; the economy of good construction. Drawing of plans and elevations of a frame residence from sketches. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Basic Mechanical Drawing II or equivalent.

### **8-341. Architectural Drafting II**

Spring, 2 credits

LEO G. D. WIEMER

Large scale drawing of exterior and interior details for the frame residence studied in Architectural Drafting I. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Architectural Drafting I or equivalent.

### **8-342. Architectural Drafting III**

Fall, 2 credits

LEO G. D. WIEMER

Study of masonry construction and related building materials. Site plan study and drawing. Preparation of plans and elevations of a masonry building from sketches. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Architectural Drafting II or equivalent.

### **8-343. Architectural Drafting IV**

Spring, 2 credits

LEO G. D. WIEMER

Large scale drawing of exterior and interior details for the masonry building studied in Architectural Drafting III. Outline study of the Orders of Architecture. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Architectural Drafting III or equivalent.



**TECHNICAL ARTS**

## COMMITTEE

R. G. HAINSWORTH (Chairman)

SADYE F. ADELSON  
EDWARD S. COBBDOROTHY NICKERSON  
ELBRIDGE C. PURDY

MARY A. ROKAHR

**8-40. Flower Arrangement**

Fall, non-credit. Repeated in Spring and Summer

ISABELLE SMITH

A workshop for amateur flower arrangers. Artistic flower arrangements, care and preservation of plant material, collection and preparation of material for arrangements in season. Members of the class supply their own material and containers.

**8-55. Introduction to Interior Decoration**

Fall, non-credit. Repeated in Spring

MARTHA L. HENSLEY

A non-credit course designed for persons who wish a non-professional knowledge of the principles of color and design to help them with their home-decorating problems. Topics discussed include discovering and using design, elements and principles of design, color and color systems.

**8-65. Modern Homemaking for Employed Men and Women**

Fall, non-credit

SADYE F. ADELSON and SPECIALISTS

Up-to-the-minute practical information on home management and family relationships is given by specialists in a series of popular lectures, each followed by a question-and-answer period. The course is designed primarily for married and engaged couples, but is open to others. Registration for one head of the family will include the other. Attendance of both is encouraged.

The course will be developed around the interests of members to cover such topics as: family financial planning; menu planning; buying food; selecting the home; functional house planning; selecting and arranging home furnishings; selecting and storing household equipment; managing the work in the home; selecting clothing to suit pocketbook, wearer, and function; care of clothing; family cooperation; and child guidance.

**8-188. Glass Blowing**

Year, 2 credits each semester

L. B. CLARK, SR.  
L. B. CLARK, JR.

A laboratory course for technicians. Simple manipulation of joining, bending, and shaping is carried through to the production of useful apparatus. Metal in glass and glass to metal seals of all types are made. During the first semester the soft glasses are utilized for practice; during the second semester the related glasses are used. Ample opportunity for advanced work is given those who show themselves particularly adapted to the work. (New students may be admitted in the Spring if space permits.)

**8-230. Household Furnishings I—Furniture**

Fall, 2 credits

MARTHA L. HENSLEY

A survey of furniture from the early Egyptian period to the present day. The survey includes the effect of government, conditions, and architecture on the furniture of each period. The present day adaptations and uses of the furniture of each period are studied.

**8-231. Household Furnishings II—Textiles**

Spring, 2 credits

MARTHA L. HENSLEY

A survey of household textiles from the early Oriental periods to the present day. The survey includes the decorative designs, weaves, and fibers of each period. The present day adaptations and uses of the fabrics of each period are studied.

**8-415. Food Cost Control**

Fall, 2 credits

LOUISE A. K. FROLICH

Consideration of the basic problems of food cost control including recipe standardization, portion control, daily food cost control, storeroom and purchasing records, equipment records, and labor costs. Students will have opportunity to present situations peculiar to their own food service for group discussion. One hour lecture and two hours laboratory work on problems of food cost control. *Prerequisite:* Completion of courses in food purchasing for group feeding, quantity cookery, and institution administration or institution management; or their equivalent in practical experience, as approved by instructor.

**PHOTOGRAPHY****COMMITTEE**

R. G. HAINSWORTH (Chairman)

EDWARD S. COBB

RAYMOND DAVIS

WILLIAM J. FORSYTHE

R. J. LEFEBVRE

KEITH B. LEWIS

ALBERT R. MATERAZZI

HOWLAND PIKE

ELBRIDGE C. PURDY

ROY M. REEVE

**8-70. Survey of Photography**

Fall, non-credit. Repeated in Spring and Summer

WILLIAM C. MCHENRY

This is a lecture, demonstration course of a non-technical nature. It is intended particularly for those camera enthusiasts who desire a clearer understanding of how their cameras, films and prints work. Better pictures should be the result of taking this course. Topics covered: camera types and operation; film types and uses; developing and printing; filters; exposure; planning, composition and lighting; portraiture; motion pictures; color photography. Exhibition and demonstration of equipment, materials and techniques supplement class lectures and discussion.

**8-80. Survey of Motion Picture Photography**

Fall, non-credit

LANCE G. HOOKS

A non-technical lecture-demonstration course designed especially for amateur movie makers. Covers the fundamental techniques of making color and black and white personal motion pictures. Topics include: camera sizes, types and operation; film types and uses; lenses; filters; planning; continuity; composition; lighting; exposure; editing; titling and projection. Exhibition and demonstration of equipment, materials, techniques supplement class lectures and discussion.

**8-85. Offset Lithographic Reproduction I**

Fall, non-credit

RICHARD C. BALL

Advantages and limitations of the various printing processes, letterpress, intaglio, and offset. Step by step demonstration of all operations involved in lithographic reproduction. Simplified publication planning and preparation

of copy for reproduction. Pencil drawings, crayon, wash drawings, pen sketches, photographs, half-tone clippings and how they reproduce. Simplified method for scaling enlargement and reduction of original copy. How various colors reproduce; color combinations which cannot be reproduced. Reproduction of photographs by halftone screening. Layout and imposition of negatives on the "flats." Graining plate metal and printing the image on the zinc plate. Operation of offset presses. Identification and correction of reproduction faults.

## 8-86. Offset Lithographic Reproduction II

Spring, non-credit

RICHARD C. BALL

Workshop class with student participation. Operation of the lithographic camera. Processing lithographic films. Methods of control by exposure, development, and reduction of images. Comparison of various orthochromatic and panchromatic lithographic films. Color filters and their uses in photographing colors in original copy. Halftone theory and practice with the contact halftone screen and with optical screens. Control of contrast by multiple exposures and the use of halftone filters. Drop-out reproductions, flashing, and halftone dot control. Offset stripping, tools, techniques, and trade practice. Surprinting, mask printing, step-over, and methods of registering. Simple chemistry and practice in making zinc plates. Function and operation of the offset press. Printing, papers, inks, fountain solutions, humidity. Analysis and correction of offset process troubles.

## 8-192. Fundamentals of Photography I

Fall, 2 credits. Repeated in Spring

EDWARD S. COBB

Forms a foundation for all of the more advanced courses in photography. Topics covered: nature of the photographic process; light as applied to photography; factors in development; developing solutions; exposure; lenses and image formation; photographic light and lighting; fixing and washing processes; and principles and use of filters.

## 8-193. Practice of Photography I

Fall, 2 credits. Repeated in Spring

JAMES A. BEALES

This course furnishes laboratory practice and demonstration of the principles taught in Fundamentals of Photography I. It offers the student an opportunity to become familiar with recommended procedures and techniques. Topics covered: contact printing and processing; selection of printing papers; processing of negative roll film, cut film and film pack; diagnosis and remedy of processing defects; types of cameras, their operation and uses, and the application of filters. *Prerequisite:* Fundamentals of Photography I, or taken concurrently with Fundamentals of Photography I.

## 8-194. Salon Technique, Art and Composition

Fall, 2 credits

RICHARD C. BALL

Analysis and demonstration of the various pictorial elements necessary to successful picture making. Training the student to recognize and use such factors as mass, line, form, space, tone, perspective, and design to serve the picture purpose. How to dramatize the subject. Developing creative imagination.

## 8-195. Fundamentals of Photography II

Spring, 2 credits

JOSEPH A. SCHANTZ

Subjects included: practical sensitometry and gradation control; the theory of projection printing; the nature of photographic light, its characteristics, control and measurement; shutter types and their performance; chemistry of photographic processes and the use of color film. *Prerequisite:* Fundamentals of Photography I.

**8-196. Practice of Photography II**

Spring, 2 credits

JAMES A. BEALES

Subjects included: application of sensitometric measurements, projection printing, print correction, composite printing, lighting, rendition of form and texture, light patterns, the effect of light on color, toning and print quality analysis. *Prerequisite:* Practice of Photography I.

**8-197. Pictorial Photography—Special Techniques**

Spring, 2 credits

RICHARD C. BALL

A workshop class with the students participating. Use of special printing papers and special processing for unique effects. Making and using texture screens. Formulas and procedure for toning prints in various colors. Solarization and bas-relief printing. Making and using paper negatives. The tone-separation process, its uses and simplified procedure. How to make photograms, carbo prints, and carbon transfers. Complete procedural phases of the Flexi-chrome process.

**8-270. Color Photography I—Camera Techniques**

Fall, 3 credits

NORBERT L. YOUNG

Covers the general camera techniques of color photography and the use of current materials and equipment. Instruction in lighting, exposure, color balance and processing of monopack materials such as Kodachrome and Ektachrome. Lectures and supervised studio and laboratory demonstrations. *Prerequisite:* Fundamentals of Photography II and Practice of Photography II or equivalent in training and experience.

**8-271. Color Photography II—Camera and Printing Techniques**

Spring, 3 credits

NORBERT L. YOUNG

The making of still and table top color pictures from the start to the finished picture, with demonstrations and practice in lighting and the use of a view camera.

The printing is designed to cover in detail the use of the color Printon method. Instruction and laboratory work in the characteristics and processing of Printon: masking techniques; and color balance control. Lectures and supervised laboratory work along with "shooting" 4 × 5 color transparencies.

**8-360. Portrait Photography**

Year, 2 credits each semester

ELBRIDGE C. PURDY

A studio and darkroom course that provides opportunity for practice. The student learns through individual guidance the subtleties of fine portrait work. Lighting, posing, composition, processing and re-touching. *Prerequisite:* Practice of Photography II.

**8-011. Photographic Roundtable**

Year, non-credit

ELBRIDGE C. PURDY and OFFICERS

The Roundtable has been formed to provide opportunity for the continued study of photography. The group meets twice each month during the regular school year. One meeting is devoted to constructive analysis of photographic work presented by members; the other meeting is devoted to presentation of information about new developments and techniques in photography and to other topics of current interest. The Roundtable sponsors an Annual Salon.

Registration is open to persons who have completed any of the courses in photography offered by the Graduate School. No fee is charged; registration, however, is required.



# Faculty

## FACULTY, DEPARTMENTAL AND SPECIAL COMMITTEES

The year following the name represents the first year of association with the Graduate School.

- ABERDEEN, ESTHER J., (1950) Ph.D., Chicago. Geologist, U. S. Geological Survey, Department of Interior. Taught at Chicago, Milwaukee-Downer, Northwestern and Wellesley. (Physical Sciences)
- ABRAHAMSEN, MARTIN A., (1950) Ph.D., Wisconsin. Principal Agricultural Economist, Farm Credit Administration, USDA. Taught at West Virginia and North Carolina State College of Agriculture and Engineering. (Social Sciences)
- ACKER, LAURENCE W., (1946) C.P.A. Assistant Chief, Accounting Systems Division, General Accounting Office. Taught at Tyler Commercial College. (Public Administration)
- ACKERMAN, CLARA B., (1950) M.A., George Washington. Editor, Extension Service Review, Extension Service, USDA. (Committee on Information)
- ADAMS, EVA B., (1949) LL.B., American. Administrative Assistant to Senator McCarran of Nevada, U. S. Senate. Taught at Nevada. (Public Administration)
- ADAMS, SIDNEY J., (1946) LL.B., Columbus. Administrative Officer, Bureau of Agricultural and Industrial Chemistry, USDA. (Office Techniques)
- ADCOCK, ROBERT E., (1949) M.S., Oklahoma A. and M. Chief, Training Section, Production and Marketing Administration, USDA. Taught at Oklahoma A. and M. and Cameron State Agricultural College. (Committee on Correspondence Study and Extension Education)
- ADELSON, SADYE F., (1949) M.A., California. Technical Assistant to the Chief, Bureau of Human Nutrition and Home Economics, USDA. (Technology)
- ALBEE, GEORGE W., (1951) Ph.D., Pittsburgh. Assistant Executive Secretary, American Psychological Association. Taught at Pittsburgh. (Social Sciences)
- ALLIN, BUSHROD W., (1939) Ph.D., Wisconsin. Chairman, Outlook and Situation Board, Bureau of Agricultural Economics, USDA. Taught at Wisconsin. (Social Sciences)
- ALLSMAN, TEN M. F., (1948) Assistant Director, Office Methods Division, Department of the Navy. (Office Techniques)
- ALPERT, HARRY, (1951) Ph.D., Columbia. Analytical Statistician, Bureau of the Budget. Taught at Queens College, City College of the City of New York, Yale, and American. (Mathematics and Statistics)
- AMES, SARAH L., (1951) B.S., Alabama. Head, Directive Systems Section, Department of the Navy. (Office Techniques)
- ANDERSON, LOUIS H., (1945) LL.B., Washington College of Law. Offset Composition Development Officer, Government Printing Office. (Languages and Literature)
- APPELMAN, PAUL L., (1946) Examiner in Accounting, Examining and Placement Division, Civil Service Commission. (Public Administration)
- ARNOULD, JACK, (1948) LL.M., University of Paris. Assistant to the Air Attache, French Embassy. Taught at Georgetown. (Languages and Literature)
- ASAY, IVAN, (1950) M.S., Syracuse. Chief, Planning Staff, National Bureau of Standards, Department of Commerce. Taught at Denver. (Public Administration)
- ASKEGAARD, DAVID, (1950) B.S., North Dakota State. Budget Officer, Rural Electrification Administration, USDA. (Technology)
- ATKINSON, JAY, (1951) Ph.D., Iowa State. Chief, Business Review Section, Department of Commerce. Taught at Iowa State, Connecticut and George Washington. (Social Sciences)
- AYLESWORTH, PHILLIP F., (1949) M.S., Purdue. Administrative Officer, Office of the Secretary, USDA. (Social Sciences)
- BACHMAN, KENNETH L., (1950) Ph.D., Harvard. Head, Farm Classification and Analysis Section, Bureau of Agricultural Economics, USDA. (Social Sciences)
- BAKER, GLADYS L., (1945) Ph.D., Chicago. Agricultural Historian, Bureau of Agricultural Economics, USDA. (Public Administration)
- BALDAUF, TONY M., (1951) Chief, Procurement Management Section, Office of Budget and Finance, USDA. (Office Techniques)
- BALL, RICHARD C., (1950) Photo-lithographer, Office of Plant and Operations, USDA. (Technology)
- BAMFORD, RONALD, (1949) Ph.D., Columbia. Dean of Graduate School, University of Maryland. (Biological Sciences)
- BARLEY, FRANK, (1952) LL.B., George Washington. Chief, Inspection Division, U. S. Civil Service Commission. (Public Administration)
- BARTLETT, L. GEORGE, (1947) C.P.A., B.C.S., Southeastern. Reviewing Examiner, Farm Credit Administration, USDA. (Committee on Internal Audit)

- BAUER, MAGNA E., (1943) Auguste Victoria Lyzeum, Berlin. Historian Translator, Office of the Chief of Military History, Department of the Army. (Languages and Literature)
- BAYLIS, CHARLES A., (1952) Ph.D., Harvard. Professor of Philosophy and Director of Graduate Studies in Philosophy, Duke University. Taught at Brown and Maryland. (Languages and Literature)
- BEACHAM, LOWRIE M., JR., (1950) B.S., South Carolina. Chief, Canned Foods Branch, Food and Drug Administration, Federal Security Agency. Taught at South Carolina. (Physical Sciences)
- BEALES, JAMES A., (1948) Assistant Chief, International Press Service, International Information Administration, Department of State. (Technology)
- BEAR, N. ROBERT, (1948) B.S., Ohio State. Chief, Division of Organization and Personnel Management, Office of Personnel, USDA. Taught at Ohio State and Michigan State. (Public Administration)
- BEAUCHAMP, GEORGE E., (1944) Ph.D., Northwestern. Educational Consultant, Veterans Administration. Taught at Manchester College, Northwestern, and Nottingham. (Languages and Literature)
- BECKNELL, HARVEY E., (1949) M.A., Columbia. Chief, Division of Training and Utilization, Office of Personnel Administration, Department of Labor. (Public Administration)
- BELL, E. DONALD, (1951) Office of Vice-President, Southern Railway System. (Office Techniques)
- BELL, HARRY M., JR., (1951) B.S., Washington and Jefferson. District Records Management Officer, Potomac River Naval Command, Department of the Navy. (Office Techniques)
- BENNEWITZ, ECKHARD, (1952) A.B., Cincinnati. Budget Examiner, Bureau of the Budget. Taught at George Washington and American. (Public Administration)
- BENTON, MILDRED C., (1950) A.B., Washington. Librarian, Naval Research Laboratory. (Public Administration)
- BERCAW, LOUISE O., (1949) Assistant Librarian, USDA. (Committee on Correspondence Study and Extension Education)
- BERNARD, EUDORA K., (1952) Reporter, Ace Reporting Company. Taught at Coastal Business College. (Office Techniques)
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- GEHRING, J. H., (1949) C.E., Rutgers. Manager, Ordnance Facilities Branch, Bureau of Yards and Docks, Department of the Navy. (Technology)
- GEISLER, MURRAY A., (1948) M.A., Columbia. Assistant Chief, Planning Research Division, Office of Comptroller, Department of the Air Force. (Mathematics and Statistics)
- GILL, WILLIAM A., (1950) The William Gill Company, Management Consultants. (Public Administration)
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- KRIESBERG, MARTIN, (1952) Ph.D., Harvard. Marketing Specialist, Production and Marketing Administration, USDA. Taught at American. (Public Administration)
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- LAMPHERE, WILLARD H., (1952) B.S., Idaho. Chief, Division of Production Programs, Office of Information Services, Production and Marketing Administration, USDA. (Committee on Information)
- LANCASTER, OTIS E., (1950) Ph.D., Harvard. Head, Applied Mathematics Branch, Research Division, Bureau of Aeronautics, Department of the Navy. Taught at Harvard and Maryland. (Mathematics and Statistics)
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- LAPHAM, LEWIS J., (1952) M.S., Syracuse. Administrative Assistant, Government Operations Subcommittee, House Committee on Expenditures. Taught at Florida State. (Public Administration)
- LARRIMER, WALTER H., (1949) Ph.D., Ohio State. Staff Assistant, Branch of Research, Forest Service, USDA. (Committee on Internship Cooperation)
- LARSEN, HARALD C., (1946) M.S., Kansas State. Agricultural Economist, Office of Price, Production and Marketing Administration, USDA. Taught at Kansas State and Wisconsin. (Mathematics and Statistics; Social Sciences)
- LESSWELL, HAROLD, (1946) Ph.D., Chicago. Professor, Yale School of Law. Taught at Chicago. (Social Sciences)
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- LAZZARI, PIETRO, (1944) Master Artist, Ornamental School of Rome. Belle Arti. Portrait artist, landscape painter, and graphic designer. Taught at American and Beaux Arts Institute of Design, New York. (Technology)



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- LECLERG, E. L., (1949) Ph.D., Minnesota. Research Coordinator, Agricultural Research Administration, USDA. (Biological Sciences)
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- LEEDY, DANIEL L., (1950) Ph.D., Ohio State. Biologist, Fish and Wildlife Service, Department of the Interior. (Biological Sciences)
- LEFEBVRE, R. J., (1946) B.Ch., New York. Chief, GPO-Department of State Service Office. (Technology)
- LEHMAN, ARNOLD J., (1949) Ph.D., M.D., Stanford. Chief, Division of Pharmacology, Food and Drug Administration, Federal Security Agency. Taught at Washington, Stanford, Oklahoma, and Wayne. (Physical Sciences)
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- LEVY, JOSEPH B., (1952) Ph.D., Harvard. Senior Research Associate, Naval Ordnance Laboratory, Department of the Navy. (Physical Sciences)
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- MAXWELL, ROBERT W., (1946) M.A., Nebraska. Commissioner of Accounts, Bureau of Accounts, Department of the Treasury. (Public Administration)
- MCCABE, TERRENCE W., (1951) Ph.M., Wisconsin. Economist, Production and Marketing Administration, USDA. (Languages and Literature)
- MCCLARREN, J. KENDALL, (1946) Chief, Division of Information, Bureau of Animal Industry, USDA. Taught at Northeastern Teachers College. (Languages and Literature; Committee on Publications)
- MCCORMICK, JAMES H., (1946) M.S., Georgetown. Deputy Director, Office of Information, USDA. (Committee on Publications)
- MCGERR, PATRICIA, (1951) M.S., Columbia School of Journalism. Free-lance writer. (Languages and Literature)
- McHENRY, WILLIAM C., (1948) Photographer, National War College, Department of Defense. (Technology)
- MCINTYRE, E. R., (1950) Editor, Office of Information, USDA. (Committee on Information)
- McKENNA, DUANE A., (1952) B.F.A., South Dakota. Artist Illustrator, Bureau of Ships, Department of the Navy. Taught at South Dakota. (Technology)
- MCLEAN, ARTHUR B., (1942) M.S., Alabama. Chief, Technical Staff Branch, Productivity and Technical Assistance Division, Mutual Security Administration. (Public Administration)
- McSHEA, JOHN F., (1941) C.P.A. Assistant Chief Auditor, Production and Marketing Administration, USDA. (Committee on Internal Audit)
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- MILLER, A. R., (1949) D.V.M., Iowa State. Assistant Chief, Bureau of Animal Industry, USDA. (Office Techniques)
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- MOSEMAN, ALBERT H., (1947) Ph.D., Minnesota. Chief, Bureau of Plant Industry, Soils and Agricultural Engineering, USDA. (Biological Sciences)
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- NEIKIRK, ROBERT S., (1951) B.S.E.E., Purdue. Engineer, Technical Standards Division, Rural Electrification Administration, USDA. (Technology)
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- NICHOLS, MARK L., (1950) D.Sc., Clemson. Chief of Research, Soil Conservation Service, USDA. (Physical Sciences)
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- NIKIFOROFF, CONSTANTIN C., (1948) Ph.D., St. Petersburg. Soil Scientist, Bureau of Plant Industry, Soils and Agricultural Engineering, USDA. Taught at Minnesota and Maryland. (Physical Sciences)
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- NOLAN, EDWIN T., (1949) B.C.S., Columbus. Assistant Chief, Accounting Systems Division, General Accounting Office. (Public Administration)
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- NOWICKI, ALBERT L., (1948) M.C.E., Minnesota. Chief Topographic Engineer, Operations and Planning Staff, Army Map Service, Department of the Army. (Technology)

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- O'KEEFE, JOHN A., (1949) Ph.D., Chicago. Mathematician, Geodetic Division, Army Map Service, Department of the Army. Taught at Harvard and Brenau. (Technology)
- OLSON, BYRON J., (1952) Ph.D., M.D., Minnesota. Medical Director, Laboratory of Infectious Diseases, National Institutes of Health, Federal Security Agency. Taught at Minnesota and Stanford. (Biological Sciences)
- OLSON, HENRY W., (1947) Ph.D., Ohio State. Associate Professor, Wilson Teachers College. Taught at Southeast Missouri State College, New Hampshire, Catholic, Johns Hopkins, Maryland, and Ohio State. (Biological Sciences)
- OLSON, KENNETH W., (1952) M.A., Michigan. Head, Division of Foreign Agricultural Information, Office of Foreign Agricultural Relations, USDA. (Languages and Literature)
- ORNSTEIN, JACOB, (1952) Ph.D., Wisconsin. Assistant Professor (On Leave), New Mexico A. and M. Taught at Wisconsin, Waldorf, and Catawba. (Languages and Literature)
- PABST, W. R., (1948) Ph.D., Columbia. Head Statistician, Quality Control Division, Bureau of Ordnance, Department of the Navy. Taught at Cornell, Amherst, and Tulane. (Mathematics and Statistics)
- PARKER, MARION W., (1935) Ph.D., Maryland. Senior Plant Physiologist, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA. Taught at Maryland. (Biological Sciences)
- PARKIN, ERNEST J., (1950) B.S., George Washington. Mathematician, U. S. Coast and Geodetic Survey, Department of Commerce. Taught at Ohio State. (Technology)
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- POTTER, WILLIAM D., (1952) B.S., California Institute of Technology. Hydraulic Engineer, Bureau of Public Roads, Department of Commerce. (Technology)
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- PROSCHAN, FRANK, (1952) M.A., George Washington. Mathematical Statistician, National Bureau of Standards. Taught at George Washington and National Bureau of Standards Graduate School. (Mathematics and Statistics)
- PURDY, ELBRIDGE C., (1943) Chief, Photographic Section, Office of Plant and Operations, USDA. (Technology)
- PURVES, C. M., (1926) M.A., Minnesota. Assistant Chief, Regional Investigation Branch, Office of Foreign Agricultural Relations, USDA. Taught at Texas A. and M. (Mathematics and Statistics)
- RADFORD, RICHARD A., (1950) B.A., Cambridge. Research Economist, International Monetary Fund. (Social Sciences)
- RADOMSKI, JACK L., (1952) Ph.D., George Washington. Pharmacologist, Food and Drug Administration, Federal Security Agency. (Physical Sciences)



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- RAPER, ARTHUR F., (1942) Ph.D., North Carolina. Social Scientist, Division of Farm Population and Rural Life, Bureau of Agricultural Economics, USDA. Taught at Agnes Scott College. (Social Sciences)
- RAPPELEYE, HOWARD S., (1946) Chief, Section of Leveling, Division of Geodesy, U. S. Coast and Geodetic Survey, Department of Commerce. Taught at Columbia, Howard, Maryland, and Catholic. (Technology)
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- ROSEN, S. MCKEE, (1949) Ph.D., London. Chief, Office of Foreign Technical Assistance in Public Administration, Bureau of the Budget. Taught at Chicago, American, and Roosevelt. (Mathematics and Statistics)
- ROSENBAUM, MARCUS A., (1951) Cartographer, Aeronautical Chart and Information Service, Department of the Air Force. Taught at Northeastern. (Technology)
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- ROSER, VIRGINIA B., (1950) B.A., Emerson. (Languages and Literature)
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- SCHOTT, RALPH G., (1947) Ph.D., Iowa State. Animal Husbandman, Bureau of Animal Industry, USDA. Taught at Iowa State, Princeton, Johns Hopkins, and Ohio State. (Agricultural Research Center Committee)
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- SERVESON, EDWIN H., (1951) B.S.C.E., Cooper Union. Hydrographic Engineer, Hydrographic Office, Department of the Navy. (Technology)
- SETTE, F. J., (1941) M.S., Harvard. Deputy Director, Resources Division, Research and Development Board, Office of the Secretary of Defense. Taught at Norwich, Puerto Rico, and Virginia Polytechnic Institute. (Technology)
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- SHAW, B. T., (1950) Ph.D., Ohio State. Research Administrator, Agricultural Research Administration, USDA. Taught at Ohio State. (Biological Sciences)
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- SHAW, WARREN C., (1951) Ph.D., Ohio State. Agronomist, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA. Taught at North Carolina State and Ohio State. (Biological Sciences)
- SHUMAN, FREDERICK G., (1951) D.Sc., Massachusetts Institute of Technology. Meteorologist, Weather Bureau, Department of Commerce. (Physical Sciences)
- SIEGEL, IRVING, (1949) Ph.D., Columbia. Co-Director, American Technology Study, Twentieth Century Fund. (Mathematics and Statistics)
- SIEGEL, JACOB S., (1949) M.A., Pennsylvania. Statistician, Population Division, Bureau of the Census, Department of Commerce. (Social Sciences)
- SIEGLER, E. H., (1948) Ph.D., Maryland. Senior Entomologist, Bureau of Entomology and Plant Quarantine, USDA. (Agricultural Research Center Committee)
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- SIMMONS, LANSING G., (1952) B.S.C.E., Maryland. Chief Mathematician, U. S. Coast and Geodetic Survey, Department of Commerce. (Technology)
- SIMMS, D. HARPER, (1952) B.J., Missouri. Chief, Information and Education Division, Soil Conservation Service, USDA. (Committee on Publications)
- SKOP, JACOB, (1951) Special Assistant to the Commanding Officer, Army Map Service, Department of the Army. (Technology)
- SLATER, C. S., (1950) M.S., North Dakota. Project Supervisor, Research Division, Soil Conservation Service, USDA. Taught at North Dakota and Yankton. (Physical Sciences)
- SMALL, NORMAN J., (1948) Ph.D., Johns Hopkins. Legal Analyst, Legislative Reference Service, Library of Congress. Taught at Johns Hopkins and Hunter. (Public Administration)
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- SMITH, LOUIS C., (1949) S.J.D., National. Senior Attorney, Copyright Office, Library of Congress. Taught at National. (Public Administration)

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- SMITH, WILEY C., (1946) M.S., George Washington. Chief, Chemical and Drug Section, Catalog Branch, Federal Supply Service, General Services Administration. (Technology)
- SMOOT, MARGARET M., (1952) Editor, Bureau of Agricultural and Industrial Chemistry, USDA. (Committee on Publications)
- SNYDER, F. F., (1949) B.C.E., Ohio State. Hydraulic Engineer, Corps of Engineers, Department of the Army. (Technology)
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- SPANIER, DAVID H., (1950) M.P.L., National. Staff Assistant, President's Commission on the Health Needs of the Nation. (Public Administration)
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- STAUBER, B. RALPH, (1931) M.A., Minnesota. Chief, Division of Agricultural Price Statistics, Bureau of Agricultural Economics, USDA. Taught at Minnesota. (Mathematics and Statistics)
- STEELE, J. GORDON, (1942) Ph.D., Ohio State. Head, Survey Analysis Section, Soil Conservation Service, USDA. (Physical Sciences)
- STEINBERG, JOSEPH, (1942) B.S., City College of the City of New York. Chief, Sampling Section, Population and Housing Division, Bureau of the Census, Department of Commerce. (Mathematics and Statistics)
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- STEPHENS, EDMUND, (1952) M.S., Oregon State. Assistant Chief, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA. (Office Techniques)
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Index prepared by Mabel Hunt Doyle



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